

CALIFORNIA HIGH-SPEED TRAIN

Project Environmental Impact Report /
Environmental Impact Statement

WORKING
DRAFT

Preliminary

Fresno to Bakersfield
**Alternatives Analysis
Report**

Volume II

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California High-Speed
Rail Authority



U.S. Department of Transportation
Federal Railroad Administration



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California High-Speed Train Project



Fresno to Bakersfield Section Project EIR/EIS

ALTERNATIVES ANALYSIS REPORT DRAFT

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APPENDIX A

Alternatives Analysis Methods for Project-Level EIR/EIS

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California High-Speed Train Project



TECHNICAL MEMORANDUM

Alternatives Analysis Methods For Project EIR/EIS Version 2

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1.0 PURPOSE

1.1 Introduction

This memorandum serves as a guide to the regional teams in conducting Alternatives Analysis (AA) studies for California High-Speed Train (HST) project sections of the HST system. The AA will incorporate conceptual engineering information and will identify feasible and practicable alternatives to carry forward for environmental review and evaluation in Environmental Impact Reports/Environmental Impact Statements (EIR/EIS) for sections of the California HST Project (CHSTP). In developing the AA the regional teams will begin analysis with the alternatives selected with the previously prepared statewide and Bay Area program EIRs/EISs. After identifying initial project alternatives; alignment plans, profiles, and sections will be developed and used for the preliminary evaluation of the alternatives. The AA evaluations will be used to assist the California High-Speed Rail Authority (Authority) and the Federal Railroad Administration (FRA) in identifying the range of potentially feasible alternatives to analyze in the draft project EIR/EIS. The guidelines contained in this memorandum are designed to maintain consistency among the regional teams in identifying an appropriate range of alternatives to analyze in each EIR/EIS, conducting a preliminary analysis, applying evaluation measures, and documenting the evaluation process, while still allowing flexibility to account for consideration of regional differences.

1.2 Applicability

The AA is intended to provide the Authority and the FRA with sufficient information and documentation to provide a clear understanding of the evaluation process used to identify and define a range of reasonable, practicable, and feasible project alternatives. The Authority and the FRA expect to make the results of the AA available for public input. The alternatives evaluation will support decisions guiding the project design and environmental review process, including specifically the identification of reasonable alternatives to be further considered in the project environmental analysis and the identification of alternatives that will not be studied in the EIR/EIS analysis. The Authority and the FRA will make these decisions considering agency and public input. The results of the AA will be presented in an AA Report providing the basis for drafting the Alternatives chapter in the Draft Project EIR/EIS.

This memorandum applies to the initial review and analysis process to be used by each of the regional teams in identifying the full range of HST project alternatives and station sites for preliminary review in order to support decisions determining the reasonable and feasible alternatives to carry forward for further engineering and environmental review. Each regional team is to use the engineering HST Basis of Design Technical Memo in its evaluation efforts, but will have flexibility if needed, to identify additional evaluation measures that are specific to its region. This memorandum is consistent with the guidelines developed for the project environmental review phase, as defined by the HST Project Environmental Analysis Methodologies Report, and will help to ensure a consistent level of documentation of the analytic process for determining the alternatives to be analyzed in a project EIR/EIS.

1.3 OVERVIEW

Whereas the program EIR/EISs analyzed alternative corridors and station location alternatives, site-specific alignment and station alternatives will be developed for the project AA. In the statewide program EIR/EIS, No Project, Modal, and HST Alternatives were considered. The Authority and FRA selected the HST Alternative and selected corridor alternatives and station location options for further analysis, and identified needs for HST system cleaning and maintenance facilities. The Bay Area to Central Valley HST Program EIR/EIS supported Authority and FRA selection of corridor alternatives and station location options for further analysis in the Bay Area and Central Valley regions. The program-level environmental reviews were integrated with early steps in the Clean Water Act Section 404 alternatives analysis process.

The evaluation conducted for each of the AAs will be based on a level of detail that considers preliminary project features at a 2% to 4% level of engineering design. The analysis of alternatives will take into account previous work conducted for the Program EIRs/EISs. In some locations, program-level decisions narrowly defined the HST corridor, while in other locations a broader area was defined as the corridor for

further evaluation. In addition, each of the regional teams will consider public and agency comments in response to the project EIR/EIS scoping processes and direction from the Authority and FRA. Input received during the agency involvement process will also be considered a key part of the alternatives analysis process to identify reasonable and feasible alternatives to carry forward for environmental review. The AA reports will document how each of the alternatives meets the Purpose and Need for the project, and how evaluation measures were used to determine which alternatives would be carried forward for environmental analysis and which alternatives did not meet the evaluation measures and would not be carried forward for further analysis. An outline of the AA Report is attached as Appendix A.

After the AA Reports have been finalized with the practicable and feasible HST location and design alternatives, a Draft Project Description will be prepared incorporating a description of the alternatives to be carried forward for environmental review. The Draft Project Description will describe all design features and assumptions for the alternatives to support environmental evaluation and will be updated and finalized when a level of 15% preliminary engineering design is completed.

1.4 Additional Information

Additional information and resources on HST system background, technical guidance, and evaluation measures as well as previous Authority and FRA decisions can be found in the following locations.

<http://www.cahighspeedrail.ca.gov/>

Final Program EIR/EIS, Volumes 1 through 3, August 2005; the Authority's Certification and Decision on the Final Program EIR/EIS (Resolution No. 05-01); FRA Record of Decision for California High-Speed Train System, November 18, 2005, including the Mitigation Monitoring and Reporting Plan, the Summary of Public Comments from CEQA Certification, and the Errata for the Final Program EIR/EIS.

Final Bay Area to Central Valley High-Speed Train Program EIR/EIS, Volumes 1 through 3, May 2008, including the Mitigation Monitoring and Reporting Plan, the Summary of Public Comments from CEQA Certification, and the Errata for the Final EIR/EIS; the Authority's Certification and Decision on the Final Program EIR/EIS (Resolution No. 08-01); and FRA Record of Decision, December 2, 2008.

<https://ww2.projectsolve2.com/eRoom/SFOF/CAHSRProgramMgmt>

2.0 LEVEL OF EFFORT

2.1 APPROACH

The AA will document the initial process of defining and evaluating project alternatives for sections of the HST system. The process will begin with the alignment and station information provided in the relevant program EIR/EIS, which with additional information gathered by the section design team and information collected during scoping, will be used by the team to identify preliminary project alternatives. These alternatives will include alignment alternatives, station site alternatives, alternative sites for maintenance and storage facilities, and power supply facility alternatives needed for the HST system section. As the AA process continues, the alternatives will be revised using CHSTP design criteria for trackwork geometries, civil and structures design, systems design, and train operations.

The AA Reports are to provide sufficient detail to document the evaluation process used to identify reasonable and feasible project alternatives that would meet the Purpose and Need for the project and are consistent with the Basis of Design Report, as well as to identify those alternatives where environmental issues (severe conflicts or constraints) or engineering challenges may justify dropping them from further analysis. The AA Reports are to provide comparative information and data that highlight and compare similarities and differences between alternatives by using project design criteria. Each Regional Team will evaluate preliminary location and design alternatives against existing conditions, project-related changes, applicable state and federal standards, environmental impact criteria, design criteria, construction and operating factors, to support identification and selection of the reasonable range of practicable and feasible alternatives for project environmental review.

The process will include the following steps:

Step 1: Initial Development of Alternatives

Using the selected program-level corridor alignments and station locations, develop site-specific project alternatives considering current contextual conditions and constraints as well as information gathered during the scoping process. It is essential to start with the selected program alternatives as these were identified as likely to contain the Least Environmentally Damaging Practicable Alternative (LEDPA) with concurrence by the U.S. Environmental Protection Agency and the U.S. Army Corps through the Clean Water Act Section 404 alternatives analysis process.

A presentation will be made to the PMT/Authority/FRA on the initial alternatives developed for further consideration through the AA process based on:

- a) the Program Level selected alternatives, alignment routes, and station locations and consideration of purpose and need/project objectives;
- b) public and agency input received during and after scoping; and
- c) further analysis of the study area to identify alternatives and/or variations and design options that are practicable and feasible.

The results of the presentation and review comments received will be documented in a Draft section of the AA Report entitled *Initial Development of Alternatives*.

Step 2: Early Outreach to Agencies and Public

The initial alternatives identified for further consideration will be presented informally to the local and state participating, responsible and trustee agencies and the federal participating and cooperating agencies identified in the CAHST Agency Coordination Plan and have agreed to be part of the HST Project environmental process. When project alternatives encroach or pass over or under State Highway facilities, coordination with Caltrans will be initiated by the regional team. The regional team will also seek comment from non-governmental agencies such as operating railroads. The initial alternatives will also be presented to Native American tribes and minority and/or low income interest groups as part of

the outreach implementation for HST Projects presented in Technical Memo *Agency, Environmental Justice, and Tribal Coordination Guidelines for Project Level EIR/EIS* dated July 31, 2009.

Following the presentation to the agencies and non government agencies, public information meetings will be conducted, as needed, to present the initial alternatives identified for further consideration.

Step 3: Revise Initial Development of Alternatives AA Report Section

Based on information and feedback received from early outreach, the Draft section of the AA Report, *Initial Development of Alternatives*, will be revised and resubmitted to the PMT/Authority/FRA for review.

Step 4: Conduct Project Alternatives Staff Workshop

A workshop will be conducted by the Regional Consultants with the PMT/Authority/FRA to present the details and information regarding all alternatives studied to date. This will include discussion of severe design constraints or conflicts, and environmental impacts and benefits for each alternative. The purpose of the workshop is to obtain direction from the Authority and FRA on the need for further investigating specific alternatives, to discuss alternatives where no further analysis is needed, evaluation results and conclusions, and material to present in the AA Report.

Step 5: Prepare Alternatives Analysis (AA) Draft Report

An AA Draft Report will be prepared that presents the results of the AA process to this point. The AA Draft Report will include a preliminary definition of the project alternatives using the Basis of Design Report and applicable Technical Memoranda.

Step 6: Initiate PMT/Authority/FRA/AG Review

The AA Draft Report will be reviewed by the PMT/Authority/FRA. When approved for release, the AA Draft Report will be posted to the Authority's website.

Step 7: Make Presentation to CAHSRA Board

The results of the AA Draft Report will be presented to the Board as an information agenda item.

Step 8: Conduct Outreach to Agencies and Public

The alternatives identified for inclusion in the EIR/EIS will be presented to the local and state participating, responsible, and trustee agencies and the federal participating and cooperating agencies identified in the CAHST Agency Coordination Plan that have agreed to participate in the HST Project environmental process. Coordination with Caltrans will be initiated by the regional team when project alternatives encroach or pass over or under State Highway facilities. The regional team will also seek input from non-governmental agencies such as operating railroads. The alternatives identified for inclusion in the EIR/EIS will also be presented to Native American tribes and minority and/or low income interest groups as part of the outreach implementation for HST Projects presented in Technical Memo *Agency, Environmental Justice, and Tribal Coordination Guidelines for Project Level EIR/EIS* dated July 31, 2009.

Following the presentation to the agencies and non government agencies, public information meetings will be conducted, as needed, to present the alternatives identified for inclusion in the EIR/EIS.

Step 9: Prepare Alternatives Analysis (AA) Final Report

An AA Draft Report will be finalized and will include the results of outreach meetings and consultation with cooperating and other agencies. The AA Final Report will be reviewed by the PMT/Authority/FRA and posted to the Authority's website when approved for release.

Step 10: Prepare Draft Project Description

A draft Project Description will be prepared with the results of the AA Final Report and the level of engineering design completed to date. The Project Description will be updated as the engineering design continues and finalized when 15% design is completed.

2.2 COORDINATION

Each Regional Team will coordinate their efforts with the project management team (PMT), Authority, and FRA. Coordination will also occur with other Regional Teams, as needed, for similar technical work occurring within immediately adjacent sections of the proposed HST system.

Preliminary information including the initial project alternatives as well as initial alternatives screening and evaluation shall be presented to the PMT, Authority, and FRA using diagrams, drawings, and memoranda that effectively communicate the information while minimizing preparation time and effort. The AA reports will be initially reviewed by the PMT, revised and submitted to the Authority and FRA for their review and comment. In addition, each AA Report will contain a discussion of the coordination and consultation efforts related to alternatives analysis and opportunities for agency and public input in the process. Coordination among regional teams is required at shared project limits where the end points would connect at common stations (example: Union Station for Anaheim to LA and LA to Palmdale sections).

3.0 ASSESSMENT / ANALYSIS

3.1 ALTERNATIVES EVALUATION

The AA evaluation will be conducted using standardized evaluation measures so that each of the alternatives can be compared with each other in an effort to identify feasible and reasonable alternatives for study and alternatives that would not be studied due to environmental or engineering issues that would make approvals or implementation infeasible, that would not reduce or avoid adverse environmental impacts, that would not meet purpose and need and project objectives, or would not be feasible or practicable to construct. Starting with the alternatives selected through the program-level analyses, each AA Report will assess preliminary alignments and station sites appropriate to the section of the HST system being studied, using the evaluation measures discussed in Section 4.0; however, each of the regional teams will have the flexibility to weight evaluation measures differently to reflect the relative importance of issues in their region. Each report will include a brief discussion that characterizes key constraints or concerns in the region and explains evaluation measures used. Specific evaluation measures to be used in addition to the evaluation measures listed in Section 4.0 below must be discussed with and approved in advance by the PMT, Authority, and FRA. Applicable evaluation, discussion, and conclusions from the program EIRs/EISs should be incorporated as appropriate into the AA Reports.

3.2 SCOPE OF ANALYSIS

Whereas the Program EIR/EIS evaluated the potential impacts various system alternatives would have at a planning level of detail, the AA Reports will assess preliminary project alignments, station sites and related facilities sites at a site-specific level of detail. The AA Reports will document literature review, database queries, and field reconnaissance and will include a discussion of potential environmental constraints related to short-term and long-term effects. Short-term impacts will include construction, construction staging and other implementation issues. Long-term impacts will consider the direct and indirect effects and daily operations of the project. The AA Reports are to describe the physical effects of the location and design alternatives as well as consistencies with federal, and state environmental standards and future planned development. The AA Reports are to describe a range of typical measures or engineering designs that could be considered to avoid, minimize, or mitigate potential impacts and an assessment of the reasonableness and feasibility of these measures. Appropriate measures and engineering designs to be considered should be identified first from the mitigation monitoring and reporting programs approved for the two Program EIR/EISs, and then should be further defined and refined to apply to the site-specific and regional issues.

4.0 EVALUATION MEASURES

4.1 CHSTP DESIGN OBJECTIVES

Project alternatives shall be evaluated using system performance criteria that address design differences and qualities. Alignment and station performance objectives and criteria are:

Objective	Criteria
Maximize ridership/revenue potential	Travel time Route length
Maximize connectivity and accessibility	Intermodal connections
Minimize operating and capital costs	Operations and maintenance issues and costs

4.2 COMPARISON OF ALTERNATIVES

In addition to the CHSTP objectives and criteria above, further measures to evaluate and compare the project alternatives are described below. Where it is possible to quantify the effects, estimates are to be provided, and where it is not possible to quantify effects, qualitative evaluation should be provided.

- A. Land use supports transit use and is consistent with existing, adopted local, regional, and state plans, and is supported by existing or future growth areas as measured by:

Measurement	Method	Source
Development potential for Transit Oriented Development (TOD) within walking distance of station	Identify existing and proposed land uses within 1/2-mile of station locations. Identify if there are TOD districts, a TOD overlay zones, mixed use designations, or if local jurisdiction have identified station areas for redevelopment or economic development	Regional and local planning documents and land use analysis and input from local planning agencies
Consistency with other planning efforts and adopted plans	Qualitative - General analysis of applicable planning and policy documents	Land use analysis and input from planning agencies

- B. Construction of the alternative is feasible in terms of engineering challenges and right-of-way constraints as measured by:

Measurement	Method	Source
Constructability, access for construction; within existing transportation ROW	Extent of feasible access to alignment for construction	Conceptual design plans and maps
Disruption to existing railroads	Right-of-way constraints and impacts on existing railroads	Conceptual design plans and maps

Disruption to and relocation of utilities	Number of utilities crossed.	Conceptual design plans and maps
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- C. Minimize disruption to neighborhoods and communities – extent to which an alternative minimizes right-of-way acquisitions, minimizes dividing an established community and minimizes conflicts with community resources as measured by:

Measurement	Method	Source
Displacements	If possible, estimate number of properties by land use type that would be displaced. Or acres of land within the right-of-way/station footprint, by type of land use: single family, multifamily, retail/commercial, industrial, etc.	Identified comparing the alignment conceptual design drawings with aerial photographs, zoning maps, and General Plan maps.
Properties with Access Affected	Estimate number of potential locations along the alignments or at station locations where, and extent to which, access would be affected.	conceptual design plans and aerial photographs
Local Traffic Effects round stations	Identify potential locations where increase in traffic congestion or LOS are expected to occur.	Existing traffic LOS from local jurisdictions
Local Traffic Effects at-grade separations	Identify potential locations at-grade separations where increases in traffic congestion or LOS are expected to occur.	Existing traffic LOS from local jurisdictions

- D. Minimize impacts to environmental resources – extent to which an alternative minimizes impacts on natural resources as measured by:

Measurement	Method	Source
Waterways and wetlands and nature preserves or biologically sensitive habitat areas affected	Identify new bridge crossings required; rough estimate of acres of wetlands, width of waterways crossed; acres and species of T&E habitat affected; acres of natural areas/critical habitat affected	conceptual design plans and GIS layers; Section 404(b)1 analysis
Cultural resources	Identify locations of NRHP or CHRIS listed properties. For archaeological resources identify areas of high or moderate sensitivity based on previous studies conducted in the study area.	Based on conceptual design plans and GIS layers; Section 4(f) studies and cultural resource records search and surveys
Parklands	Estimate number and acres of parks that could be directly and indirectly affected. This would also include major trails that would be crossed;	conceptual design plans and GIS layers; Section 4(f) studies

Agricultural lands	Estimate acres of prime farmland, farmland of statewide importance, unique farmland, and farmland of local importance within preliminary limits of disturbance	conceptual design plans and GIS layers
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E. Extent to which an alternative minimizes impacts on the natural environment as measured by:

Measurement	Method	Source
Noise/Vibration effects on sensitive receivers	Identify types of land use activities that would be affected by HST passby noise and ground vibration.	Results of screening level assessment; inventory of potential receivers from site survey and aerial maps
Change in visual/scenic resources	Identify number of local and scenic corridors crossed and scenic/visual resources that would be affected by HST elevated structures in scenic areas and shadows on sensitive resources (parks). Identify locations where residential development is in close proximity to elevated HST structures.	Results of general assessment; survey of alignment corridors and planning documents from local and regional agencies
Maximize avoidance of areas with geologic and soils constraints	Identify number of crossings of known seismic faults, estimate acres of encroachment into areas with highly erodible soils, acres of encroachment into areas with high landslide susceptibility.	USGS maps and available GIS data; CA Dept. of Conservation's California Geologic Survey, Regional Geologic Hazards & Mapping Program, check Map Index to identify maps appropriate for HST sections [www.conservation.ca.gov]
Maximize avoidance of areas with potential hazardous materials	Identify hazardous materials/waste areas to avoid and constraints	Data from previous records search conducted for other projects within study area.

5.0 DOCUMENTATION

5.1 LEVEL OF IMPACT

Each preliminary alternative should be evaluated individually under each objective and criterion at a preliminary level of analysis sufficient to identify potentially severe constraints and to provide an overall comparative analysis of the potential 'levels of impact' for the alternatives in a summary format. This information is expected to support determination of the feasible alternatives to be analyzed in the Draft Project EIR/EIS and the alternatives dismissed from further consideration. Starting with the Authority's adopted program-level Mitigation Monitoring and Reporting Plans, the Regional Team should identify practical mitigation measures, design considerations or avoidance techniques to address ways to minimize or avoid potentially significant impacts for consideration in the EIR/EIS. The measures should illustrate a general approach versus describing specific mitigation measures which would be addressed in the EIR/EIS. The measures should account for cause, effect, resolution and follow an "if this", "then that" format. Consideration should be given to estimated costs and likely ability to mitigate different ROW and environmental impacts.

5.2 ALTERNATIVES COMPARISON

The primary purpose of the AA Reports is to clearly describe the relative differences between preliminary alternatives based on a consistent set of evaluation measures applied to each alternative. The AA Reports will summarize the attributes, potential design issues and environmental impacts and benefits for each alternative in matrix format. Alternatives identified to be dropped from further analysis should be included in the matrix and reasons for dropping the alternative should be described in the summary.

6.0 REFERENCES

6.1 INFORMATION FOR INCLUSION

All references will follow the format guidelines provided for the CHSTP. All sources must be referenced, including text, data, graphics, base maps, etc. Full referencing is also required in the text of the document in a footnote at the end of the sourced text. For tables, references will be listed as sources at the bottom of the table. For graphics, references, including base mapping, will be listed as sources in the legend.

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APPENDIX A

ALTERNATIVE ANALYSIS REPORT OUTLINE



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California High-Speed Train Project



_____ to _____ Section Project EIR/EIS

ALTERNATIVES ANALYSIS REPORT

Prepared by: _____
XXX Date

Checked by: _____
XXX Date

Reviewed by: _____
XXX Date

Approved by: _____
XXX Date

Released by: _____
XXX Date

Revision	Date	Description
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ABBREVIATIONS / ACRONYMS

(Revise for each HST Project)

Amtrak.....	National Railroad Passenger Corporation
Authority	California High-Speed Rail Authority
BNSF	Burlington Northern Santa Fe
Caltrans	California Department of Transportation
CEQA.....	California Environmental Quality Act
CNG.....	Compressed Natural Gas
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
FRA	Federal Railroad Administration
GIS.....	Geographic Information System
GPS	Global Positioning System
HOV.....	High Occupancy Vehicle
HST	High-Speed Train
KOP	Key Observation Point
LRT	Light Rail Transit
MPH	Miles per Hour
NEPA	National Environmental Protection Act
PMT.....	Program Management Team
ROW.....	Right-of-Way
RRC	Regional Rebuild Center
RTP	Regional Transportation Plan
SR	State Route
TOD.....	Transit Oriented Development
USGS	United States Geological Survey
UP	Union Pacific

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1.0 INTRODUCTION

The California High-Speed Rail Authority (the Authority) is studying alternative alignments for a high-speed train section between _____ and _____. This study incorporates conceptual engineering information and identifies feasible and practicable alternatives to carry forward for environmental review and evaluation in the Environmental Impact Report/Environmental Impact Statement (EIR/EIS) under the California Environmental Quality Act (CEQA) and the National Environmental Protection Act (NEPA) for the _____ to _____ section of the California High-Speed Train (HST) Project.

1.1 CALIFORNIA HST PROJECT BACKGROUND

The California High-Speed Train (CAHST) is planned to provide intercity, high-speed train service on over 800 miles of tracks throughout California, that will connect the major population centers of Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego. The HST system is envisioned as a state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail technology, which will include state-of-the-art safety, signaling, and automated train-control systems. The trains will be capable of operating at speeds of up to 220 mph over a fully grade-separated, dedicated track alignment, with an expected express trip time between Los Angeles and San Francisco of approximately 2 hours and 40 minutes.

The California HST project will be planned, designed, constructed, and operated under the direction of the California High-Speed Rail Authority (Authority), a state governing board formed in 1996. The Authority's statutory mandate is to develop a high-speed rail system that is coordinated with the state's existing transportation network, which includes intercity rail and bus lines, regional commuter rail lines, urban rail and bus transit lines, highways, and airports.

1.2 _____ TO _____ EIR/EIS BACKGROUND

1.3 STUDY AREA

1.4 PURPOSE OF STUDY

This Alternatives Analysis (AA) Report uses preliminary planning, environmental, and engineering information to identify feasible and practicable alternatives to carry forward for environmental review and preliminary engineering design in the _____ to _____ HST Project EIR/EIS. This report is to assist the Authority and the FRA in identifying the range of potentially feasible alternatives to analyze in the draft Project EIR/EIS. It documents the preliminary evaluation of alternatives, indicating how each of the alternatives meets the purpose for the HST project, how evaluation measures were applied and used to determine which alternatives to carry forward for detailed environmental analysis, and which alternatives not to carry forward for further analysis.

The analysis begins with the alignment corridor selected at the conclusion of the 2005 Final Statewide Program EIR/EIS process. Public and agency comments in response to the Project EIR/EIS scoping processes and during ongoing interagency coordination meetings, and direction from the Authority and FRA were used to identify initial alternatives to carry forward for detailed environmental review. After identifying initial project alternatives, alignment plans, profiles, and cross-sections have been developed and used for this preliminary evaluation of the alternatives.

Section 2.0 describes the evaluation measures used for the AA process. Each of the project alternatives is described in detail in Section 3.0. Section 4.0 evaluates the alternatives and Section 5.0 summarizes the results of the AA analysis.

2.0 ALTERNATIVES DEVELOPMENT PROCESS

The process for this study involves the creation and refinement of alternatives, through a series of processes that are intended to compare alternatives. This study follows a defined alternative analysis process as described in the Technical Memo Alternatives Analysis Methods for Project EIR/EIS, Version 2 (October 2009), and uses both qualitative and quantitative measures that reflect a mixture of applicable policy and technical considerations.

The techniques that are used to gather information, develop and compare alternatives are described below:

Field Inspections of Corridors - The potential alignment, right-of-way, and station location are the subject of field inspection by experienced planning personnel, engineers, and analysts with experience in railroad operations, to identify conditions and factors not visible in aerial photos or on maps. Over the course of the study, field inspections become progressively more detailed as the alternatives are refined by the planning and engineering work.

Project Team Input and Review - The project team conducts team meetings to discuss alternatives and local issues that potentially impact alignments.

Qualitative Assessment - A number of the qualitative measures used to describe the alternative alignments are developed by professionals with experience in the construction and operation of high-speed rail and other transportation systems. These measures include constructability, accessibility, operability, maintainability, right of way, public infrastructure impacts, railway infrastructure impacts, and environmental impacts.

Engineering Assessment - Engineering assessments are provided for a number of measures that can be readily quantified at this stage of project development. The engineering assessments can provide information on project length, travel time, and configuration of key features of the alignment such as the presence of existing infrastructure.

GIS Analysis - The bulk of the assessment is performed using GIS data, which enables depictions of the project's interactions with a variety of measurable geographic features, both natural and built. GIS data is used to assess impacts on farmland, water resources, floodplains, wetlands, threatened and endangered species, cultural resources, current urban development, infrastructure, and oil and gas exploration and production.

2.1 HST PROJECT PURPOSE

The purpose of California High Speed Train (HST) Project is to implement the statewide HST System in sections along the corridors selected in program-level (Tier 1) decisions that will: (1) link Southern California cities, the Central Valley, Sacramento, and Bay Area; (2) provide a new transportation option that increases mobility throughout California; (3) provide reliable HST service that delivers predictable and consistent travel times using electric powered steel wheel trains, and (4) provide a transportation system that is commercially viable.

Specific project objectives of the HST system within the _____ to _____ section include:

- Improve mobility by relieving the mounting capacity and congestion constraints on the local interstate freeways (name freeways) and on State Routes (name state routes) through providing a choice of a high speed train transportation mode.

- Improve mobility by relieving the increasing capacity and congestion constraints at the XXX Airport through providing a choice of a high speed train transportation mode.
- Reduce the capacity constraints and congestion on freight and passenger rail infrastructure along the (name existing rail corridor) corridor by providing a choice of a high speed train transportation mode.
- Maximize connectivity and accessibility for passenger rail and transit at XXX Station.
- Provide a sustainable reduction in travel time between ____ and ____.
- Provide a HST alignment that is feasible in terms of engineering challenges and right-of-way constraints.
- Minimize disruptions to neighborhoods and communities along the corridor by minimizing right-of-way acquisitions, project design effects, and/or the potential for affecting community resources.
- Preserve environmental quality and protect sensitive environmental resources by reducing emissions and vehicle miles traveled for intercity trips within the XXX and XXXX Counties area, and by maximizing avoidance and minimizing impacts to sensitive environmental and natural resources adjacent to the project corridor.
- Maximize the ridership/revenue potential for the XXX Counties region by providing reliable HST operation.
- Minimize capital and operating costs related to construction, operations and maintenance of the ____ to ____ section of the statewide HST system.

2.2 IDENTIFICATION OF ALTERNATIVES TO BE CARRIED FORWARD

The aim of this document is to document the evaluation process and to identify alternatives that should be carried forward through the environmental process and engineering design. Significant issues that would qualify an alternative to be carried forward from further consideration include:

- Alternative meets purpose and need and project objectives in providing a sustainable reduction in travel time between major urban centers.
- Alternative has no environmental or engineering issues that would make approvals infeasible.
- Alternative is feasible or practical to construct.
- Alternative reduces or avoids adverse environmental impacts.

2.3 HST DESIGN OBJECTIVES

To determine each alternative's ability to meet the HST Project's primary intent, the project alternatives are evaluated using system performance criteria that address design differences and qualities in the alignment and the station locations in terms of performance. These objectives and criteria are summarized in

Table 2-1: Alignment and Station Performance Objectives and Criteria

Objective	Criteria
Max. Ridership/ Revenue potential	Travel Time
	Route Length
Maximize connectivity and accessibility	Intermodal connections
Minimize operating and capital costs	Operating and maintenance costs
	Capital cost

2.4 COMPARISON OF PROJECT ALTERNATIVES

In addition to the HST Project objectives and criteria presented above, additional measures are used to evaluate and compare the project alternatives. Each of these five additional measures is discussed in more detail below.

- A. Land use supports transit use and is consistent with existing, adopted local, regional and state plans, and is supported by existing or future growth areas.

Table 2-2: Land Use Evaluation Measures

Land Use		
Measurement	Method	Source
Development potential for Transit Oriented Development (TOD) within walking distance of station	Identify existing and proposed land uses within 1/2-mile of station locations. Identify if there are TOD districts, a TOD overlay zones, mixed use designations, or if local jurisdiction have identified station areas for redevelopment or economic development	Regional and local planning documents and land use analysis and input from local planning agencies.
Consistency with other planning efforts and adopted plans	Qualitative - general analysis of applicable planning and policy documents	Land Use Analysis. Baseline Conditions Study

- B. Construction of the alternative is feasible in terms of constructability and right-of-way (ROW) constraints.

Table 2-3: Constructability Evaluation Measures

Constructability and Right of Way		
Measurement	Method	Source
Constructability, access for construction, within existing transportation ROW	Extent of feasible access to alignment for construction	Conceptual design plans and maps
Disruption to existing railroads	Right-of-way constraints and impacts on existing railroads	Conceptual design plans and maps
Disruption to and relocation of utilities	Number of utilities diversions	Conceptual design plans and maps

- C. Minimizes disruption to neighborhoods and communities – extent to which an alternative minimizes right of way acquisitions, minimizes dividing an established community and minimizes conflicts with community resources.

Table 2-4: Community Evaluation Measures

Minimized Disruption to Neighborhoods and Communities		
Measurement	Method	Source
Displacements	If possible, number of properties by land use type that would be displaced. Or acres of land within the right-of-way/station footprint, by type of land use: single family, multifamily, retail/commercial, industrial, etc.	Identified comparing the alignment conceptual design drawings with aerial photographs, zoning maps, and General Plan maps.
Property with Access Affected	Identify potential locations along the alignments or at station locations where access would be affected.	Estimated off conceptual design plans and aerial photographs
Local Traffic Effects around Stations	Identify potential locations where increases in traffic congestion or LOS are expected to occur.	Existing traffic LOS from local jurisdictions
Local Traffic Effects at-grade separations	Identify potential locations at-grade separations where increase in traffic congestion or LOS are expected to occur.	Existing traffic LOS from local jurisdictions

- D. Minimize impacts to environmental resources - extent to which an alternative minimizes impacts on natural resources.

Table 2-5: Environmental Resources Evaluation Measures

Minimized Impact on Environmental Resources		
Measurement	Method	Source
Waterways and wetlands and natural preserves or biologically sensitive habitat areas affected	Identify new bridge crossings required; rough estimate of acres of wetlands, linear feet of waterways; acres and species of T&E habitat affected; acres of natural areas/critical habitat affected	Measured off conceptual design plans and GIS layers.
Cultural Resources	Identify locations of NRHP or CHRIS listed properties. For archaeological resources identify areas of high or moderate sensitivity based on previous studies conducted in the study area.	Based on conceptual design plans and GIS layers; Section 4(f) studies and cultural resource records search and surveys.
Parklands	Number and acres of parks that could be directly and indirectly affected. This would also include major trails that would be crossed;	Based on conceptual design plans and GIS layers; Section 4(f) studies
Agricultural Lands	Acres of prime farmland, farmland of statewide importance, unique farmland, and farmland of local importance within preliminary limits of disturbance.	Based on conceptual design plans and GIS layers.

- E. Enhances environmental quality — extent to which an alternative minimizes impacts on the natural environment.

Table 2-6: Natural Environment Evaluation Measures

Minimize Impact on Natural Environment		
Measurement	Method	Source
Noise and Vibration effects on sensitive receivers	Identify types of land use activities that would be affected by HST passby noise and ground vibration.	Results of FRA screening level assessment. Inventory of potential receivers from site survey and aerial maps.
Change in visual/scenic resources	Identify number of local and scenic corridors crossed and scenic/visual resources that would be affected by HST elevated structures in scenic areas and shadows on sensitive resources (parks). Identify locations where residential development is in close proximity to elevated HST structures.	Result of general assessment. Survey of alignment corridors and planning documents.
Maximize avoidance of areas with geological and soils constraints	Identify number of crossings of known seismic faults, acres of encroachment into areas with highly erodible soils, acres of encroachment into areas with high landslide susceptibility.	USGS maps and available GIS data
Maximize avoidance of areas with potential hazardous materials	Hazardous materials/waste constraints	Data from previous records search conducted for other projects within study area.

3.0 PROJECT ALTERNATIVES

The evaluation of alternatives is based on the key differentiators between alternatives. Impacts or features of critical importance that are common to all alternatives are summarized in the section below.

3.1 NO PROJECT ALTERNATIVE

The No Project Alternative represents the existing conditions of the ____ to ____ section as it exists today and as it would exist in the future without the HST Project based on future development projects and improvements to the intercity transportation system that are programmed and funded For construction. The alternative includes current and future projects within the study area, as listed by Caltrans, XXX (include and cite all other transportation planning agencies including the most recent version of the Regional Transportation Plan (RTP)). Major projects included in the No Project Alternative are shown in XXXX (provide a graphic showing these projects in relation to the HST Project) and described below.

3.1.1 Related Studies

(Discuss development Project that are proposed or planned and not funded)

3.2 PROGRAM ALTERNATIVES

3.2.1 Statewide Program EIR/EIS Alternatives

The statewide Program EIR/EIS for the CAHST was completed in November 2005. The Authority and FRA selected the technology for the HST vehicles and identified potential route and station location options through the program environmental analysis. For a more detailed examination of these issues, refer to the *California High-Speed Train Final Program EIR/EIS*.

The Program EIR/EIS examined three major alternatives for the statewide transportation network. They were:

No Project Alternative – The State's transportation network as it is today, along with funded projects included in regional transportation plans.

Modal Alternative – Enhancements to the State's transportation network using existing modes and technologies (mainly expanded airports and highways).

High-Speed Train Alternative – A new high-speed train system to connect California's major urban centers.

The HST Alternative was the selected system alternative in the Program EIR/EIS. The No Project Alternative was not able to provide the needed level of intercity mobility in the future, while the Modal Alternative provided reduced mobility compared to the HST Alternative. In addition, the Modal Alternative would have a higher cost than the HST Alternative, and more significant environmental impacts.

3.2.2 _____ to _____ Routing and Station Alternatives

The alignment and station options carried forward for further consideration in the Program EIS/EIR for the ____ to ____ section are:

3.2.3 Selected Program Alternatives and Station Locations

The Authority and FRA selected the XXXXXX alignments and station locations for HST service between _____ and _____ (Provide graphic).

3.3 INITIAL DEVELOPMENT OF PROJECT ALTERNATIVES

(Present history of the development of the project alternatives starting with the Program Level alternatives.)

3.3.1 Initial Review of Alternatives

3.3.2 Agency Coordination and Public Outreach

(Need to provide a description of interagency meetings, technical working group meetings, and a summary of the public outreach efforts. Append this report with the Outreach Summary Reports.)

3.3.3 Alternatives/Options Carried Forward/Not Carried Forward

Alternatives/Options not to be carried forward

-

Alternatives/Options to be carried forward:

-

4.0 EVALUATION OF ALTERNATIVES

Following the evaluation outlined in Section 2, each alternative is assessed for each of the project objectives and evaluation measures. This information is then used to decide which alternatives are carried forward into preliminary engineering design and environmental review as part of the EIR/EIS.

Table 4-1: Summary of Comparison of Alternatives

Category	Measurement	Alternative 1	Alternative 2
Design Objectives	Journey time		
	Route length		
	Intermodal Connections		
	Operating Costs		
	Capital Costs		
Land Use	Potential for TOD		
	Consistency with other planning efforts		
Constructability	Constructability		
	Acceptability of existing overcrossings		
	Disruption to existing railroads		
	Disruption to and relocation of utilities		
Disruption to Communities	Displacements		
	Properties with access affected		
	Local traffic effects around stations		
	Local Traffic Effects along Route		
	Highway grade separations and closures		
Environmental Resources	Biological resources		
	Cultural resources		
	Parklands		
	Agricultural Land		
Natural Environment	Noise and Vibration		
	Visual/scenic resources		
	Geotechnical constraints		
	Hazardous Materials		

5.0 ANALYSIS SUMMARY AND CONCLUSIONS

Based on the results of this evaluation, the following alignment alternatives, design options, and station locations be carried forward for further consideration into the preliminary engineering design and environmental review process.

APPENDIX A

DESIGN DRAWINGS PREPARED For EACH ALTERNATIVE

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APPENDIX B

Alternatives Analysis GIS Data Sources

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Alternatives Analysis GIS Data Sources Fresno to Bakersfield Section

No.	Data Source
1	PG&E, 2008, Gas and Electric Transmission Lines in Vicinity of City of Fresno. Provided directly by PG&E contact via email, July 2008.
2	Fresno, Kings, Tulare and Kern Counties, and Dept. of Water Resources, existing land use data. Existing land use for Fresno downloaded from City website (http://www.fresno.gov/Government/DepartmentDirectory/InformationServices/GIS/Layers.htm), January 2009. County assessor use descriptions provided by Kern County, June 2008, via email. Existing land use survey data downloaded from DWR (http://www.water.ca.gov/landwateruse/lusrvymain.cfm) for Fresno, Kings, and Tulare Counties, 1999-2003.
3	California Spatial Information Library (CASIL), hydrologic features, 1995-1999. Downloaded from http://casil.ucdavis.edu/casil/ in 2006.
4	US Fish & Wildlife Service, National Wetlands Inventory, 1983-1987. Downloaded from http://www.fws.gov/wetlands/Data/DataDownload.html in January 2009.
5	US Fish & Wildlife Service, Central Valley Vernal Pool Complexes, June 1998. Downloaded from http://ftp.dfg.ca.gov/Public/BDB/GIS_Service_Center/Wetlands/Central_Valley_Vernal_Pool_Complexes/ in February 2009.
6	US Fish & Wildlife Service, Critical Habitat Boundaries, 2002-2006. Downloaded from http://criticalhabitat.fws.gov/ in January 2009.
7	California Dept. of Fish & Game, California Natural Diversity Database (CNDDB), June 2009. Received data via email link as part of regular bi-monthly subscription.
8	National Park Service, National Register of Historic Places, February 2001. Received data on disk from PB in April 2007.
9	Culturally significant sites and previously surveyed areas, California Historic Information System (CHRIS), September 2009. Data collected by URS at CHRIS center, and then digitized into GIS.
10	City of Fresno, City of Bakersfield, Kern County and USGS, Parks, 2008-2009. Parks extracted from existing land use layer downloaded from City of Fresno website (http://www.water.ca.gov/landwateruse/lusrvymain.cfm), January 2009. Downloaded Bakersfield city parks layer from http://www.bakersfieldcity.us/gis/downloads/gis_spatial_data.htm , September 2009. Extracted park locations from USGS Geographic Names Information System (GNIS), downloaded from http://geonames.usgs.gov/domestic/download_data.htm in December 2008.
11	California Dept. of Conservation, Farmland Mapping and Monitoring Program (FMMP), Important Farmlands, 2006. Downloaded from http://redirect.conservation.ca.gov/DLRP/fmmp/product_page.asp in 2008.
12	USGS GNIS, NPS National Historic Register and Fresno, Kings, Kern and Tulare County residential parcels, noise and vibration receptors, 1999-2008. Concert Halls, Concert Pavilions, Hospitals, Libraries, Places of Worship, Schools, and Theater Locations pulled from USGS GNIS database, downloaded from http://geonames.usgs.gov/domestic/download_data.htm in December 2008. Residential parcels extracted from county parcel data layers, using overlay of Fresno City land use data (downloaded from http://www.fresno.gov/Government/DepartmentDirectory/InformationServices/GIS/Layers.htm), Kern county assessor residential descriptions and DWR residential land designations.
13	California Dept. of Conservation, Division of Mines and Geology, faults, (Jennings), 1994. Data provided on disk from CDMG in November 2008.

No.	Data Source
14	US Dept. of Agriculture, Natural Resources Conservation Service (NRCS), Soil Survey Geographic Database, Erodible Soils, 2004-2008. Downloaded from soil data mart website http://soils.usda.gov/survey/geography/ssurgo/ in September 2009.
15	EPA, Facilities Database, California Dept. of Toxic Substances Control Envirostor and Geotracker databases, hazardous materials sites, 2009. Data downloaded from http://geotracker.swrcb.ca.gov/data_download.asp , http://www.envirostor.dtsc.ca.gov/public/data_download.asp and http://www.epa.gov/enviro/geo_data.html in August 2009.

GIS Sources, HMF Site Evaluation

City of Fresno Local Register of Historic Resources, March 2010 - <http://historicfresno.org/lhr/index.htm>

County of Fresno Parks and Recreation Sites, March 2010 -
<http://www2.co.fresno.ca.us/4510/4360/Parks/parksresvinfo.htm>

County of Fresno Trails network - <http://www.gofresnocounty.com/trails.aspx>

National Park Service, Land and Water Conservation Fund, Project List By County And Summary, March 2010 -
<http://waso-lwcf.nrc.nps.gov/public/index.cfm>

Kings County website, March 2010 - <http://www.countyofkings.com/>

Kings County Planning website, March 2010 -
<http://www.countyofkings.com/planning/2035%20General%20Plan.html>

Kings County General Plan 2035, January 26, 2010-03-23

Kings County GIS website, March 2010 - http://www.kingscountygis.com/parcelview/pv_blank.aspx?

Kings County Zone Map 301, adopted 1964 -
<http://www.countyofkings.com/planning/Plan/zoning%20maps/301.pdf>

Kern County website, March 2010 -
<http://search.blossom.com/query/261/form3/style1/link1/info2/type0/keepdups/limit10?key=historic+buildings>

Kern County website, March 2010 - http://maps.co.kern.ca.us/imf/sites/krn_pub/launch.jsp?verify=true

Kern Council of Governments website, March 2010 - <http://www.kerncog.org/city-mcfarland.php#>

Kern County Bicycle Plan, 2001

Kern County Master Environmental Assessment Resources, Historical Sites – 2004

Kern County Master Environmental Assessment Resources, Active Recreation - 2004

Kern County Master Environmental Assessment Resources, Passive Recreation - 2004

City of Shafter website - <http://www.shafter.com/DocumentCenterii.aspx?FID=15>

Fresno County website - <http://www.fresnocog.org/document.php?pid=180&x=33>

Fresno – Clovis Bikeways Map – May 2007

Fresno County Planned Rural Bikeway System, no date

<http://www.fresnocog.org/document.php?pid=33>

Tulare County website, March 2010 - <http://www.co.tulare.ca.us/government/rma/parks/parklocation.asp>

Tulare County website, March 2010 - <http://www.tularecountymap.com/map.html>

Tulare County website, march 2010 - http://www.co.tulare.ca.us/government/rma/planning/general_plan.asp

Tulare County website, March 2010 - http://generalplan.co.tulare.ca.us/background_report.html

Tulare County General Plan Background Report, Chapter 4, Agriculture, Recreation and Open Space, December 2007

Tulare County General Plan Background Report, Chapter 8 – Safety – Chapter 12, Bibliography, December 2007

Soil Survey, Eastern Fresno Area, United States Department of Agriculture, Soils Conservation Service, 1971

Soil Survey of Kings County, United States Department of Agriculture, Soils Conservation Service, 1986

Soil Survey of Kern County, California, Northwestern, United States Department of Agriculture, Soils Conservation Service, 1986

Soil Survey of Tulare County, Western Part, United States Department of Agriculture, Natural Resources Conservation Service, 2003

Website, April 2010, ssdata.nrcs.usda.gov

Platts, 2007-2008, Fuel and Electric Transmission Lines. Provided by URS Denver office in 2008 (they have a subscription to the database).

Fresno, Kings, Tulare and Kern County assessor offices, 2009. Data collected by URS Oakland office and transmitted to URS SF in March 2010.

USGS, October 2008, National Hydrography Dataset, hydrologic features. Provided by URS Oakland office in March 2010.

US Fish & Wildlife Service, National Wetlands Inventory, 1983-1987. Downloaded from <http://www.fws.gov/wetlands/Data/DataDownload.html> in January 2009.

California Dept. of Fish & Game, California Natural Diversity Database (CNDDB), March 2010. Received data via email link as part of regular bi-monthly subscription.

Culturally significant sites and previously surveyed areas, California Historic Information System (CHRIS), September 2009. Data collected by URS at CHRIS center, and then digitized into GIS.

California Dept. of Conservation, Farmland Mapping and Monitoring Program (FMMP), Important Farmlands, 2006-2008. Downloaded from http://redirect.conservation.ca.gov/DLRP/fmmp/product_page.asp in 2008-2010.

USGS GNIS, NPS National Historic Register and Fresno, Kings, Kern and Tulare County residential parcels, noise and vibration receptors, 1999-2008. Concert Halls, Concert Pavilions, Hospitals, Libraries, Places of Worship, Schools, and Theater Locations pulled from USGS GNIS database, downloaded from http://geonames.usgs.gov/domestic/download_data.htm in December 2008. Residential parcels extracted from county parcel data layers, using Kern county assessor residential descriptions and DWR residential land designations.

EPA, Facilities Database, California Dept. of Toxic Substances Control Envirostor and Geotracker databases, and EDR data, hazardous materials sites, 2009-2010. Data downloaded from http://geotracker.swrcb.ca.gov/data_download.asp, http://www.envirostor.dtsc.ca.gov/public/data_download.asp and http://www.epa.gov/enviro/geo_data.html in August 2009. EDR data provided by URS Oakland in April 2010.

FEMA, Digital FIRM Maps, 2008-2009, 100-Year Floodplains. Provided by URS Sacramento in March 2010.

APPENDIX C

Outreach Summary Reports

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Overview: Fresno to Bakersfield Section

Scoping Meetings

Five public scoping meetings were held for the Fresno to Bakersfield Corridor between March 18 and March 26, 2009, which were attended by a total of 400 people. The Authority and FRA received a total of 188 comments from individuals and organizations. During the public review period for the NOP/ NOI for the Fresno to Bakersfield section, between September 29, 2009 and October 30, 2009, no individual comments were received from private citizens. Following are summaries of the comments provided in conjunction with the scoping meetings.

A number of commenters noted the benefits of HST, including economic benefits and jobs, air quality improvement, traffic congestion relief, and energy conservation. Primary environmental concerns related to noise and aesthetics. A number of commenters expressed concern about the level of noise the trains may generate and how sensitive receptors will be identified. Several commenters recorded concerns about aesthetics.

Other environmental concerns mentioned in the comments included dust control, conversion of agricultural land, potential impacts on historic structures, hazardous spills, and growth inducement.

Commenters expressed concern over transportation impacts due to HST crossings of roads and the potential to block roads and intersections. Concerns regarding displacement of residents and devaluation of property were also expressed. One commenter noted the familial and cultural connections between the rural communities of Malaga, Easton, Caruthers, Fowler, Selma, Hanford and Riverdale and the need to maintain access between them. A number of comments concerned economic issues, including cost and financing of the system, use of U.S. labor and U.S. products, economic growth potential, benefits and impacts on local businesses, and employment opportunities.

A citizen's group advocating rail consolidation around Fresno advocated an HST express route to the west of Fresno, along with relocation of the UPRR tracks and the UPRR Fresno yard. They expressed concerns that HST express service through downtown Fresno would create noise and construction-related disruption, whereas a western alignment and relocation of the UPRR would have safety advantages, cause less disruption to freight service, and provide an opportunity for locating the maintenance facility at the UPRR rail yard in central Fresno. Other commenters also expressed support for these positions.

Representatives of UPRR submitted comments as part of the HST project scoping process, noting a variety of technical issues, including noting that the UPRR right-of-way varies in width through the Fresno to Bakersfield corridor. UPRR stated their belief that shared use of its track would not be feasible. They stated that, for safety reasons, there should be a 200-foot separation between freight trains and HST trains (UPRR, 2009)

Visalia-Tulare-Hanford Station Feasibility Study Outreach

In conjunction with the Visalia-Tulare-Hanford Station Feasibility Study, which concluded in August 2007, the Authority conducted a comprehensive outreach among communities along the alignment. The outreach consisted of two components. First, the project team contacted local government staff involved in transportation and planning within the study area or who were otherwise involved in the earlier Statewide Program EIR/EIS. These initial meetings led to follow-up communications with these communities and the identification of other groups or agencies to contact, including agricultural groups who identified how best to assess impacts to agriculture. The second component of the outreach process consisted of two types of meetings. The first series of meetings were with agency staff, decision-makers, and members of the public to inform them of the project, gain their knowledge of the area, and learn about important individuals and organizations the project team should include in its outreach efforts. The

second type of meetings held were with two Technical Assessment Groups (TAGs) that were organized to provide focused regional input. One TAG consisted of representatives from cities and organizations within Fresno County. The other TAG was composed of representatives within Tulare and Kings Counties and representatives from Corcoran and McFarland in Kern County.

Team members met, either on an individual basis or in groups, with agency staff directors, planners, and managers throughout the project study area to explain the purpose of the study, obtain information on local issues and ideas, and identify other individuals or organizations to meet with to discuss the project. Through this process, the project team was able to gain valuable insight on the needs of each of the communities, background data and history of their communities, and unique or important areas for the HST to avoid. These meetings enabled the team to assemble the two TAGs that provided input for all communities within the study area in a collaborative setting.

Two well-attended meetings were held individually with each TAG to obtain initial input to the study team and to provide the team with expert local knowledge, then to obtain feedback on initial study results. A final joint TAG meeting was held to present the results of the study and obtain input on its findings. The Fresno TAG meetings were held at the Council of Fresno County Governments' offices in downtown Fresno. The Kings/Tulare TAG meetings and the joint TAG meeting were held at the Visalia Convention Center in Downtown Visalia.

Other Stakeholder Outreach

In addition to the outreach efforts described above, the Authority met with local officials in public officials. This included a presentation to a joint meeting of the Corcoran Planning and Economic Development Commissions on November 09, 2009, and a briefing for the Kings County Board of Supervisors on May 3, 2010. At these meetings, Authority representatives provided project updates and responded to questions concerning the project.

APPENDIX C-1

Outreach Summary Report – Fresno Subsection

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Fresno Subsection Outreach Summary Report June – May 2010

Overview

Our team assisted planning staff in developing alternatives analyses and preparations for TWG meetings, which were held on August 12 and September 22, 2009. During this period, outreach was conducted to local elected leaders regarding station planning, scoping meetings, and next steps for HST on our alignment. Meetings were held to introduce Carrie Bowen to elected officials in the Valley, including individual meetings with the Fresno County Board of Supervisors. General outreach presentations were also given to service groups and agencies, and assistance was provided to the statewide outreach in distributing information on American Recovery and Reinvestment Act (ARRA) funding and the Heavy Maintenance Facility criteria.

Fresno TWG Meetings

Fresno TWG – August 12, 2009

Status of California High-Speed Train Project

- Where we are, ARRA funding, schedule.

High-Speed Train Alignment and Station Alternatives – AA done by Oct/Nov 2009

- Perception of local elected officials that local jurisdictions are not in lock-step.
- County-City are on same page for HST, want focus on UPRR corridor for HST.

Maintenance Facility Siting Update

- Maintenance facility open to all in Valley.
- Send out a notification letter to mailing list with criteria, also on website, hold workshops – want an open, transparent process.

Station Area Planning

- Station Constraints.
- Looking first at above-grade and at-grade.
 - Bruce: look at a station under elevated tracks.
 - Get plan lines to Keith for Alternatives through Roeding Park.
 - Discussed the need for storage tracks for HST near station.
 - Keith – potential for an intermodal station under the HST station/tracks.
 - BNSF yard another major constraint.

Fresno TWG – September 22, 2009

Brief status on HST

- ARRA funding application: \$4.5 Billion, fifty-fifty match with State bond funding.
- Split Merced to Bakersfield EIR/EIS into Merced-Fresno and Fresno-Bakersfield.
- FRA/Authority workshop on October 13, 2009 to give direction on Alternatives.

- Heavy Maintenance Facility – requirements are posted on website, next is release of process for bringing forth potential sites, likely an RFEI followed by RFP.

AA process

- Screened out Fresno HST bypass options. Bruce Rudd asked about UPRR alignment to the south, why still viable, explained the request from Visalia.
- Dennis – downtown station on the west side of the UPRR tracks will stir UPRR political issues downtown, desire is closer to downtown. Also asked why HST express track bypass option is now off the table, in light of the impacts being shown with designing the express tracks through town.
- Ed Graveline – other systems have added express bypass tracks later to be able to accommodate additional trains.
- Tom Tracy: bypass tracks in the future would not be precluded. Need to provide better clarity on the decision to eliminate bypass tracks.
- Keith: County and City have been very clear on the direction not to have an HST bypass and focus on a downtown station.
- Sandy, will need to relocate UPRR tracks within their right-of-way even with alternatives east or west of UPRR.
- Tom: all Madera alternatives feed into the Fresno UPRR alignment north of the San Joaquin River.

Next steps

- Develop a list of key decision points to provide to the various interest groups to help focus their energy.
- Do we need to develop a total Section 4(f) avoidance alternative: i.e., one that avoids both the SP station and Roeding Park?

Outreach Meetings

The following meetings were conducted from June 2009 through November 2009.

Date	Meeting	CHSRA Representative(s)	Contact	Notes
6/01/2009	North Fresno Lions Club	Eric VonBerg	Mel Kilner, 559-307-7653	
6/15/2009	Fresno Chamber Trans. Committee	Eric VonBerg	Dixie Wilson, 559-495-4821	
6/24/09	Fresno Mayor and Carrie Pourvahidi	Eric VonBerg	Bryn Forhan, 559-273-0037	
6/26/2009	Fresno Maintenance Facility Meeting	Eric VonBerg	Jeanette Ishii, 559-262-4168	
7/1/09	Fresno County Board of Supervisors	Eric VonBerg	Jeanette Ishii, 559-262-4168	
7/10/09	Fresno Maintenance Facility Meeting	Eric VonBerg	Jeanette Ishii, 559-262-4168	
7/22/09	East Fresno Rotary – Downtown Fresno Development	Eric VonBerg	Craig Scharton, 559.621.8352	

Date	Meeting	CHSRA Representative(s)	Contact	Notes
7/28/09	Meeting with Fresno Mayor Swearengin	Eric VonBerg	Bryn Forhan, 559-273-0037	
8/07/09	Pre-TWG Meeting with Craig Scharton and his staff, City of Fresno Downtown Revitalization	Eric VonBerg	Craig Scharton	Discussed HST alternatives through Fresno since he cannot make meeting on 8/12
8/12/09	HST Fresno Technical Working Group Meeting involving City of Fresno and County of Fresno staff	Carrie Bowen, Tom Tracy, Bryn Forhan, Sandy Stadtfeld and Eric VonBerg of Outreach Team	Eric VonBerg of HST Outreach Team, 559-256-1458	Reviewed the latest alternatives for the HST project through Fresno; discussed station alternatives & how different alignments affect station locations & by-pass alternatives for HST thru-tracks
8/24/09	Meeting with Fresno County Board of Supervisor Chairperson Susan Anderson	Carrie Bowen of Authority staff and Bryn Forhan, Central Valley Communications Manager	Bryn Forhan of Outreach Team, 559-273-0037	Introduced Carrie Bowen of Authority staff and update Ms. Anderson on the HST project
8/31/09	Meeting with Karana Hattersley-Drayton (City of Fresno)	Eric VonBerg	Karana Hattersley-Drayton, Historic Preservation Project Manager	One on one briefing to discuss potential impacts to registered historical structures
8/31/09	Meeting with Kevin Fabino (City of Fresno)	Eric VonBerg	Kevin Fabino, 559-621-8046	Discussed the Fresno Chaffee Zoo Expansion EIR coordination with HST. The Zoo is located in Roeding Park and is proposed to expand to Golden State Blvd. The City is anticipating receiving an Admin EIR in the next few weeks.

Date	Meeting	CHSRA Representative(s)	Contact	Notes
8/31/09	Rey Leon of MAPA	Eric VonBerg	Ray Leon of MAPA	Discussed setting UPRR forums within our sections with EJ communities to discuss issues they are concerned with. Will send him a map of our sections to help identify communities we should work with.
9/22/2009	Fresno TWG	Eric VonBerg, Brynn Forhan, Bob Schaevitz, Carrie Bowen	Bruce Rudd	Presented alternatives developed running through Fresno to be discussed at FRA workshop
10/23/2009	APWA Presentation	Eric VonBerg		Scheduled
12/10/2009	Meeting with City of Fresno	Carrie Bowen, Eric VonBerg	Jill Jones, Asst to Mayor	
12/11/2009	City of Fresno	Carrie Bowen, Bob Schaevitz, Eric VonBerg, Bob Lagomarsino		
12/17/2009	Fresno Exchange Club	Eric VonBerg	Marv Arnold	
12/23/2009	City of Fresno	Eric VonBerg		
01/19/2010	Fresno PIM	Carrie Bowen, Eric VonBerg		
01/25/2010	Clovis East HS	Eric VonBerg	Nicolette Tempesta	General outreach to students and teachers
03/11/2010	Measure C Oversight Committee	Eric VonBerg	Tony Boren	General briefing
03/16/2010	North Fresno PIM	Carrie Bowen, Sandy Stadtfeld, Eric VonBerg		Open house with Merced–Fresno team
03/17/2010	Mayor of Kingsburg	Eric VonBerg	Tony Boren	General briefing
03/22/2010	Fresno City Historic Preservation League	Eric VonBerg, Gene Tackett, Cheryl Lehn		Update, listen to comments
04/15/2010	Fresno County Agriculture and Water Committee	Tom Tracy, Carrie Bowen, Eric VonBerg, Cheryl Lehn		Overview of HST, opportunity to get input from Ag & Water Leaders from the Agriculture community

Public Information Meetings

After the formal environmental scoping period ended, the Authority hosted several public information meetings (PIMs) throughout the Fresno to Bakersfield Section. Following are summary descriptions of those meetings and the input provided at them.

In the Fresno Subsection, two meetings were held, one in January 2010 and one in March 2010. Over 200 people attended the January PIM meeting at the Tower Theater on East Olive Avenue in Fresno. A total of 43 written comment cards were received. Comments included the following:

- Support avoiding take/use of Roeding Park (9)
- Support east (UP) alignment and station location (even if the SP station needs to be relocated) (9).
- Expressed concern about noise impacts (6).
- Support western (BSNF) alignment and station location (5).
- Support maintenance facility location in Fresno (4).
- Recommend a connection between the HST and local transit (4).
- Support inclusion of bike facilities at the HST station (3).
- Recommend attractive design and landscaping for station (3).
- Supports take/use of Roeding Park (1).

The March 15, 2010, PIM was held at North Grantland Avenue, which is located within the Merced to Fresno Section. However, members of the Fresno to Bakersfield Outreach Team facilitated the meeting, and received a number of comments on the Fresno to Bakersfield Section. A total of 14 written comment cards were received. Comments included the following:

- Concerns for noise impacts (7)
- Preference for a downtown Fresno alignment and station on the east of UPRR (1)
- Concerns about use of eminent domain in Chinatown (1)
- Opposition to a downtown Fresno alternative (1)
- Preference for a bypass alternative (1)
- Location of the maintenance facility (1)

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APPENDIX C-2

Outreach Summary Report – Rural Subsection

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Fresno to Bakersfield Rural Subsection Outreach Summary Report June – May 2010

Overview

Our team assisted planning staff in developing alternatives analyses and preparations for TAG meetings, and held a Fresno to Bakersfield TAG meeting on July 1, 2009. During this period, outreach was conducted to local elected leaders regarding station planning, □cooping meetings, and next steps for HST on our alignment. Meetings were also conducted to introduce Carrie Bowen to elected officials in the Valley. General outreach presentations were given to service groups and agencies, and assistance was provided to the statewide outreach in distributing information on ARRA funding and the Heavy Maintenance Facility criteria.

Fresno to Bakersfield TAG Meetings

Fresno to Bakersfield TAG – July 1, 2009

HST Project Status and Funding Update

- Discussed current schedule for SF to Anaheim and funding.

Project Scoping Summary

- Discussed Scoping meetings, environmental process.
- Environmental Justice needs to be addressed in this area. Does not want to see their County disenfranchised by the project.

Alternatives Analysis Process (Overview and Update)

- Discussed alignment considerations from Corcoran to Wasco being adjacent to BNSF and SR-43. Scenarios include being adjacent to BN track and within their right-of-way. There is an issue with maintaining access to SR-43, due to the HST being grade-separated.
- Looking at alignments within/adjacent to BNSF right-of-way, propose to maximize use of programmatic alignment. Looking at above-grade alternatives through Shafter, and an alignment through Wasco to east of BNSF alignment.

Results from Visalia-Tulare-Hanford Station Study

- TAG recommendation is to oppose programmatic alignment west of Hanford, and only to support alignments that allow for a station in the Visalia-Tulare-Hanford area.

Outreach Meetings

The following meetings were conducted from June 2009 through November 2009.

Date	Meeting	CHSRA Representative(s)	Contact	Notes
6/05/09	Lunch with Mike Olmos	Eric VonBerg	Mike Olmos, 559-713-4332	
6/19/2009	Phone Conversation with John Lindt – Valley Voice Newspaper	Eric VonBerg	John Lindt, 559-559-300-9577	

Date	Meeting	CHSRA Representative(s)	Contact	Notes
6/26/2009	San Joaquin Valley Regional Policy Council	Eric VonBerg	Clark Thompson, 559-233-4148	
7/1/09	Fresno-Bakersfield TAG	Eric VonBerg	Mike Olmos, 559-713-4332	
8/14/09	Phone call with Corcoran City Manager	Cheryl Lehn	Ron Hoggard, City Manager	In anticipation of outreach team's presentation to Corcoran Rotary Club, the City Manager conveyed that there are more concerns with the HST alignment going through town, even if it is elevated. The preference is more for an alignment either east or west of town.
8/20/09	Corcoran Rotary Club	Eric VonBerg, Cheryl Lehn	Reuben 559-992-5151 x243, 559-469-7232 cell	Spoke with the City Manager, Ron Hoggard, and City Engineer, Steve Kroeker on preferred alignments at Corcoran. Concern with an elevated alignment above the BNSF tracks, noise impacts, and create a visual barrier to Corcoran with freight rail at-grade and HST elevated.
8/31/09	Rey Leon of MAPA	Eric VonBerg	Ray Leon of MAPA	Discussed setting up forums within our sections with EJ communities to discuss issues of concern. Mr. Leon will be sent a map of our sections to help identify communities we should work with.
11/30/2009	Kings County Board of Supervisors	Carrie Bowen, Cheryl Lehn	Larry Spikes	
12/1/2009	Hanford City Council Study Session	Carrie Bowen, Cheryl Lehn		
12/4/2009	Hanford HST meeting	Eric VonBerg	Colleen Potts	
12/10/2009	Meeting with KCAG	Eric VonBerg, Bob Lagomarsino, Mark Leese	Terry King, KCAG	

Date	Meeting	CHSRA Representative(s)	Contact	Notes
1/08/2010	Cross Valley Rail Board Update	Eric VonBerg	Christopher Tavarez	
02/17/2010	Wasco and Shafter city managers and council members	Carrie Bowen, Eric VonBerg, Gene Tackett	Christine Wilson	Briefing on alignment options
02/24/2010	KCAG Commission	Carrie Bowen, Eric VonBerg, Cheryl Lehn	Terri King, KCAG	Briefing to elected officials
02/24/2010	Agriculture leaders, Visalia/Tulare	Cheryl Lehn		
02/24/2010	Agriculture leaders, Hanford/Kings	Cheryl Lehn		
03/16/2010	Visalia City Council members	Carrie Bowen, Cheryl Lehn		Briefing for new city council members
03/09/2010	Kings County Board of Supervisors Study Session	Eric VonBerg, Cheryl Lehn		Request by Larry Spikes
April 8, 2010	Kings County Landowner Meeting	Eric VonBerg, Cheryl Lehn,	Supervisor Richard Fagundes	33 people attended to discuss landowner questions.
April 9, 2010	Visalia and North Tulare County presentation			
April 14, 2010	Kings County Agriculture Advisory Committee	Carrie Bowen, Tom Tracy, Eric Von Berg, Cheryl Lehn		
April 15, 2010	Agriculture Industry Stakeholder Meeting			
April 19, 2010	Nisei Farmers League Meeting	Carrie Bowen, Tom Tracy, Eric Von Berg, Cheryl Lehn	Manuel Cunha, President, Nisei Farmers League	Discussed questions that arose at the Kings County landowner meeting in Hanford on 4-8-10
May 3, 2010	Kings County Planning Commission	Bob Schaevitz, Eric Von Berg, Cheryl Lehn		Presentation at the request of the County CAO, Larry Spikes

Public Information Meetings

After the formal environmental ☐cooping period ended, the Authority hosted several public information meetings (PIMs) throughout the Fresno to Bakersfield Section. Following are summary descriptions of those meetings and the input provided at them.

The Authority sponsored three PIMs in the Rural Subsection provide opportunities for public input on the alignment alternatives under consideration, with a focus on property owners located adjacent and/or near to the alternative alignments. The first was in Hanford on April 27, 2010, at the Hanford Civic Auditorium. A total of 107 persons signed-in and 30 comment cards were submitted. The predominant comment themes were concerns over the loss of agricultural land, suggestions that an I-5 alignment be considered, concerns for potential noise impacts, and concerns over impacts to dairies. Following is a summary of the comments submitted:

- Strongly opposed to construction; state is \$25 billion or more in debt and HST will add another \$200 billion; where is the money, electricity coming from?
- I don't want your high speed train and I will not use it.
- The path as shown now does much damage to ancient oak trees and wildlife, not to mention historic houses.
- Your alternative route going away from the tracks south of the Kern County line to avoid Allensworth State Park and ecological preserve dissects my 6 yr old pistachio tree farm and almond farm.
- The state needs water storage, not a high speed rail through the most productive farmland in California.
- No station in Hanford.
- Where is California going to get the money? Need water more than high speed rail!
- I think it's about time! I support the Hanford substation. I wholeheartedly support the project.
- Big employer in Corcoran, Delano, and Wasco area – state employer.
- Once you get to Los Angeles on the rail, how are you going to get to your location in the huge metropolitan Los Angeles area?
- Population – the Central Valley does not need more population growth.
- Will the high speed rail be utilized?
- The train is not welcome here – period!
- The train will cause a hardship for me --- loss of quality of life.
- The Bakersfield to Fresno route should follow existing rail or highway routes, so less prime farmland is disturbed.
- This project is too costly, in this climate of schools being under funded.
- What is the decibel level of the train going into/ out of a station? At what distance – 100 yards, ¼ mile, ½ mile? Decibel level of train at full speed?
- Access to properties and business connections on both sides of the right-of-way.
- I don't support this project. It will affect my life, equity, neighbors' property and children's future.
- Deeply concerned about proposed route since it will destroy 114 years worth of hard work; dramatic effects on neighbors' property; believe that an alternative route would reduce the effect on farmers.
- Kings County Farm Bureau in opposition to the proposed high-speed rail alignment for the Fresno to Bakersfield route.
- The proposed route through the county east of Hanford is totally unacceptable.
- Proposed road crossing and driveway access would be a nightmare.
- Preference would be following the rail line through Hanford with a station south of Hanford.
- I am opposed to the current proposed high speed rail route. One of the guidelines for the high speed rail is that the proposed track would minimize disruption of land use. It was expected that the rail route would follow existing transportation corridors.

The second Rural Subsection PIM was held in Wasco on May 5, 2010, at Wasco City Hall. A total of 73 persons signed-in and 11 comment cards were submitted. The comments included the following:

- Many pipelines would be affected by the Allensworth By-Pass.
- Do not put the HSR through the campus of Bakersfield High School. The impact on current students would be very negative for a school.
- In favor of a combination of alignments that least impacts the state highways, notably Route 43.
- I am 100% opposed to Route #2.

- The proposed route to avoid Allensworth Reserve greatly impacts land that we have owned and farmed for over 50 years.
- How will you pay for it, Fed and State Govts broke.
- There is too much noise already.
- How will you replace the prime farm land?
- Would like information regarding health impact assessment for this project.
- Concerned about impacts on property of Option 1 alignment.
- What are the proposals to keep the HST connected to the small towns.
- Keep only the station in Bakersfield and Fresno and San Francisco allow train to maintain speed through valley.
- What is the time frame for paying off the debt (Bonds) for the trains
- Option 1 through Wasco would impact Housing Authority units/tenants with significant noise. Options 2 & 3 appear much better from this standpoint.

The third Rural Subsection PIM was held on May 5, 2010, in Corcoran at the Corcoran Technology Learning Center. A total of 26 persons signed-in and 3 comment cards were submitted. The comments focused on alignment preferences and potential property and business disruption associated with an alignment through Corcoran.

Other Outreach

In addition to the outreach efforts described above, the Authority met with local officials in several public meetings. These included the following meetings:

- Joint meeting of the Corcoran Planning Commission and Economic Development Commission on November 09, 2009;
- Fresno County and the Kern County Agriculture and Water committees on April 15, 2010
- Kings County Board of Supervisors Agricultural Advisory Committee on April 14, 2010
- Kings County Planning Commission on May 3, 2010
- Kings County Board of Supervisors on May 3, 2010.

At these meetings, Authority representatives provided project updates and responded to questions concerning the project.

The Authority has also continued to meet with landowners and other interested parties, including a meeting in Hanford with Kings County landowners on April 8, 2010, and in Fresno with the Nisei Farmers League on April 19, 2010.

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APPENDIX C-3

Outreach Summary Report – Bakersfield Area

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Bakersfield Subsection Outreach Summary Report June – November 2009

Overview

Our team assisted planning staff in developing alternatives analyses and preparing for TAG meetings, which were held in Bakersfield on June 16 and July 16, 2009. During this period, outreach to local elected leaders was conducted regarding station planning, □cooping meetings, and next steps for HST on our alignment. Meetings were held to introduce Carrie Bowen to elected officials in the Valley. General outreach presentations were given to service groups and agencies, and assistance was given to the statewide outreach in distributing information on ARRA funding and the Heavy Maintenance Facility criteria.

Fresno to Bakersfield TAG Meetings

Bakersfield TAG – June 16, 2009

Review of Alternatives maps.

Comments on the alternatives and specific issues near the alignments.

- There is a general consensus that the Red alignment west of downtown and the Yellow alignment east of downtown look favorable.
- Elevated, below-ground, and at-grade power issues.
- General discussion on the possibility of two station tracks through downtown Bakersfield and two bypass lines (high speed) using a separate route through Bakersfield. This alternative is not currently being considered by the Authority, but could be brought forward for consideration with a compelling reason to study it, such as being able to avoid impacts determined as unacceptable to locals.

Stations

- General consensus was for the Yellow station, but that was due to preference for the yellow alignment. Upon further discussion, it was preferred to have the yellow station further to the west, such as the blue/green station.
- Station planning will begin after alternatives are narrowed down by the Authority, and the station platform locations are determined.

Outreach and next steps

- Get feedback from Donna Kunz – Redevelopment Agency, regarding station location as it relates to her redevelopment projects in the area south of the Amtrak station. In a previous meeting, Ms. Kunz said that they have a 200-foot setback from current railroad right-of-way.
- Promote involvement of the Kern River Parkway foundation in the TAG meetings. They have an equestrian trail, bike trail, and greenbelt parkway planned along the river in the vicinity of the HST.
- Involve Native American organizations in the design process at an early stage. On previous State projects, they were often brought in too late.
- Chris Hall, Kern County Superintendent of Schools, will assist with setting up meetings with the Bakersfield High School District to discuss potential impacts to Bakersfield High.

Bakersfield TAG – July 16, 2009

Project Update

Refinements to Alternatives

Outstanding issues

Next steps

Outreach Meetings

The following meetings were conducted from June 2009 through May 2010.

Date	Meeting	CHSRA Representative(s)	Contact	Notes
6/05/2009	IDEAL Seminar on Transportation	Eric VonBerg	Randy Siefkin, 209-521-8772	
6/08/2009	Bakersfield – Kern Co Alternatives Review	Eric VonBerg	Alan Tandy, 661-326-3751	
6/16/2009	Bakersfield TAG	Eric VonBerg	Dave Price, 661-862-8802	
9/15/2009	AWMA Luncheon	Eric VonBerg, Gene Tackett		General presentation on HST
9/15/2009	Bakersfield Public Information Meeting	Eric VonBerg, Mark Weisman, Tom Tracy		Focused on Bakersfield Route through Rosedale
9/22/2009	Bakersfield Mayor Harvey Hall	Gene Tackett	Mayor	Discuss the Monday Conference call with M. Morshed.
9/24/2009	Kern County Fair	Eric VonBerg, Brynn Forhan, Bob Schaevitz, Carrie Bowen	Bob Snoddy	Requested additional flyers and latest DVD to show at Kern Council of Governments booth. Sent a packet overnight.
10/07/2009	Rosedale Public Information Meeting	Tom Tracy, Bob Lagomarsino, Eric VonBerg, Mark Weisman, Chris Bellue, Mike Lahodny		Residents were concerned with the impact to their neighborhood with high speed train tracks going through it 60 feet in the air.
11/04/2009	Kern Transportation Foundation Forum			

Date	Meeting	CHSRA Representative(s)	Contact	Notes
12/09/2009	East Bakersfield PIM	Carrie Bowen, Tom Tracy, Bob Schaevitz, Eric VonBerg, Mark Weisman, Gene Tackett	Gene Tackett	
01/21/2010	City of Bakersfield	Mark Weisman, Bob Lagomarsino	Steve Teglia	Station planning
02/16/2010	Kern County Board of Supervisors	Eric VonBerg	Nichollette Tempesta	Update elected officials
February 16, 2010	East Bakersfield Church of Christ	Carrie Bowen, Mark Weisman, Eric VonBerg, Gene Tackett	Bethel Christian	
02/17/2010	Kern Agriculture Forum	Carrie Bowen, Eric VonBerg, Gene Tackett, Cheryl Lehn	Richard Chapman, Kern EDC	Kern Farm Bureau, Kern Water District, others
02/17/2010	Bakersfield elected officials update/briefing	Carrie Bowen, Eric VonBerg, Gene Tackett	City clerk	
February 18, 2010	Kern County Outreach Meeting	Carrie Bowen		
02/18/2010	Leadership Bakersfield	Eric VonBerg, Gene Tackett	Steve Teglia	
02/26/2010	CA Partnership Board	Bryn Forhan	Mike Dozier	Presentation for elected officials
03/23/2010	Landowner meeting	Carrie Bowen, Eric VonBerg, Gene Tackett, Cheryl Lehn	Jeff Fabbri's office	Requested by Jeff Fabbri and Senator Dean Florez
April 15, 2010	Kern County Agriculture and Water Committee	Mark Weisman, Eric Von Berg, Gene Tackett, Cheryl Lehn		Overview of HST and opportunity to get input from ag and water leaders within the agriculture community

Public Information Meetings

After the formal environmental scoping period ended, the Authority hosted several public information meetings (PIMs) throughout the Fresno to Bakersfield Section. Following are summary descriptions of those meetings and the input provided at them.

In the Bakersfield Subsection, the Authority participated in three public information meetings between September 2009 and February 2010. The purpose of the meetings was to provide information to the public about the alignment options for the high speed train through Bakersfield and to solicit public input.

The first of the three Bakersfield PIMs was held on September 15, 2009, at the Red Lion Hotel. A total of 65 people signed-in at the joint scoping/PIM meeting, 3 comment cards were submitted at the meeting, and 2 email comments were submitted following the meeting. Following is a summary of the comments submitted:

- Segment of alignment between 99 and Galloway should be elevated or undergrounded.
- Easements for parking under elevated facilities
- RE: Tehachapi alignment, SR-58 at Dennison will cause severe damages.
- Is the est. 160,000 construction jobs, 90 million passengers annually and 450,000 jobs over time still valid?
- How big are the parking lots?
- How many parking spaces at the SF trans-bay terminal?
- Build it. It is great for California's economy and the environment.

The second Bakersfield PIM was held on December 4, 2009, at the Green Acres Community Center in Rosedale. The focus was on impacts to residents in Rosedale and Bakersfield from the elevated alignments. Approximately 25 residents attended. Comments discussed included:

- How loud will the trains be and how often?
- What homes will you take? How close to the tracks do you need to be to take your house?
- When will it get built? When do you start buying houses?
- Can you use eminent domain?
- When will the decision be made on which alignment to be built?
- Why are you going into downtown Bakersfield?
- What is allowed under the alignment? What will happen to the land under the alignment?

The third Bakersfield PIM was conducted on December 09, 2009, at the Martin Luther King Community Center. The focus was on the East Bakersfield neighborhood located generally east of Union Avenue between California Avenue and the BNSF tracks. Nine comment cards were submitted at the meeting, and 2 email comments were submitted following the meeting. Following is a summary of the comments submitted:

- Blue (D1) alignment is preferred over Red (D2) alignment (unanimous).
- Concerned about the loss/relocation of the Church of Christ on California Avenue.
- Concerned about loss of church services to the community.
- Concerned about displacement of people and taking of property/homes. (Some homes/buildings may have historic value).
- Concerned about devaluation of property.
- Concerned about noise and vibration.
- Concerned about impacts to existing businesses.
- Concerned about "loss of friends, memories, connections".
- Concerned about the project going down California Ave.
- In 2008 a new church building was constructed on California Ave.
- There are thousands of people who live in this community who do not have the funds to relocate.
- Public schools which are in walking distance for the many children who live here would be impacted.
- There are landmarks that are part of the community's roots.
- More people, homes, churches, schools and businesses would be impacted by the California Ave option.

- The Blue Alignment is the preferred alignment.
- Would not like to see train so close to California Street.
- Train should be placed along Truxtun.
- Path along California disrupts many of my friends and neighbors homes.
- Train's path will force people to move.
- Office products business will be displaced. Employs 50 persons.
- Disruption to business could greatly impact business.
- Red line would bring property values down.
- Blue line is less population and the values are already low.
- Red line would cause hardship on many established families.
- The Blue line is more feasible due to less population along Edison.
- Does not wish to have train in front yard.
- Concerned about increase in taxes
- Concerned about movement of people into the area impacting water, farmland.
- Project needs to focus on Amtrak tracks.
- Will property be taken via eminent domain?
- Concerns about motion and vibration.

The final Bakersfield open public meeting that the Authority participated in was organized by the Church of Christ High Speed Rail Committee at the California Avenue Church of Christ on February 16, 2010. The purpose of the meeting was to facilitate a public forum to provide comments regarding the two HST alignments (Red and Blue) under consideration in the Bakersfield area. Members of the HST Outreach team were invited to attend to provide information, answer questions and receive public comments. Sixty-one people signed-in at the meeting and 94 Church of Christ-generated form letters were received with 102 signatures opposing the HST California Avenue alignment ("red option"). Two Mount Zion form letters were received containing 45 signatures against the HST California Avenue alignment option ("red option"). There was no support for the red (D2) alignment.

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APPENDIX D

No Project Alternative

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D.0 NO PROJECT ALTERNATIVE

This section first describes the No Project Alternative established to address state and federal environmental requirements and then explains the outcomes of the Statewide Program EIR/EIS, which provided the basis for the initiation of the AA process. It then outlines the two-step process used to define and review an initial set of alternatives. Finally, it describes the alternatives that were carried forward for detailed analysis in Section 4.0 of this report based on this review.

D.1 No Project Alternative

The No Project Alternative is the reasonably foreseeable future condition absent the HST system. The No Project Alternative (Figure D-1) represents the state's transportation system (highways, air, and conventional rail) as it is currently and as it would be after implementation of programs or projects that are currently identified in regional transportation plans (RTPs), have identified funds for implementation, and are expected to be in place by 2035, the environmental study's horizon year. The level of infrastructure improvement (based on expected federal, state, regional, and local funding) was analyzed in consideration of the growth in population and transportation demand projected to occur by 2035. The future improvements that would be part of the No Project Alternative are also included under the HST "Build" Alternatives as part of the future 2035 baseline.

The No Project Alternative satisfies the statutory requirements under CEQA and NEPA for an alternative that does not include any new action or project beyond what is already committed. It is based on the following sources of information:

- State Transportation Improvement Program (STIP)
- Regional Transportation Plans (RTPs)
- State of California Office of Planning and Research CEQAnet Database
- Airport Master Plans
- City and county general plans and interviews with planning officials
- Intercity passenger rail plans

D.2 Highway Element

The highway element of the No Project Alternative consists of existing intercity travel routes serving the Fresno to Bakersfield Section area. These routes are listed in Table D-1 and shown on Figure D-1.

Table D-1. Existing Routes, Fresno to Bakersfield

Interstate Highway	State Routes
Interstate 5	SR-41, SR-43, SR-46, SR-58, SR-65, SR-99, SR-180, SR-190 and SR-198

The No Project Alternative includes this existing highway system, as well as funded and programmed improvements based on information from financially constrained RTPs for Fresno, Kern, Kings, and Tulare counties and the California Office of Planning and Research Database. The improvements consist primarily of individual interchange improvements and roadway widening projects on segments of the highway network, as shown on Figure D-1 and identified in Table D-2.

Figure D-1. No Project Alternative – Highway, Aviation, and Passenger Rail Projects

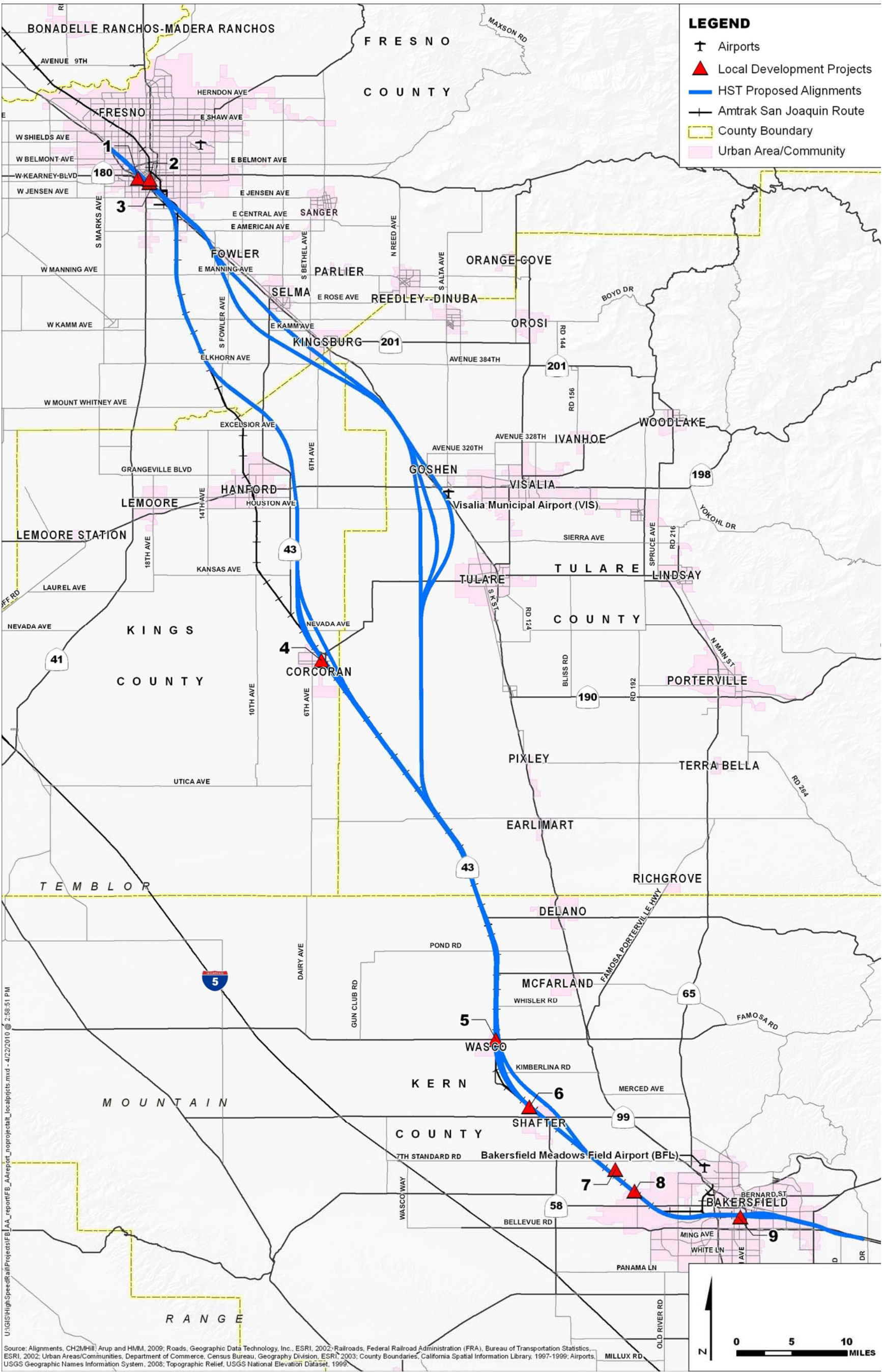


Table D-2. Programmed, Funded, and Operational Highway Improvements, by 2035

Project	Location	Figure 3-1 ID*
SR-99 widen to six lanes	Ashlan Avenue to Fresno/Madera County line	1
SR-41 southbound auxiliary lane	El Paso Avenue to Friant Road	2
SR-99 construct interchange	Grantland Ave	3
SR-41 northbound auxiliary lane	Bullard Avenue to Herndon Avenue	4
SR-99 interchange improvements	Shaw Avenue	5
SR-41 northbound auxiliary lane	Ashlan Avenue to Shaw Avenue	6
SR-41 auxiliary lanes	O Street to Shaw Avenue	8
SR-41 widen ramps to interchanges	McKinley Avenue to Shields Avenue	9
SR-180 braided ramp construction	SR-41 to SR-168	10
SR-99 update closed bridge structure	Fresno	11
SR-180 widen to 4 lanes	Temperance to Cove	12
SR-99 upgrade interchange	SR-99 to Cedar/North Avenue	13
SR-99 upgrade interchange	Central Avenue and Chestnut Avenue	14
SR-99 interchange improvements	American Avenue	15
SR-99 replace bridge structures	SR-43/Floral Road	16
SR-99 widen to six lanes	Tulare County line to SR-201	17
SR-41 widen to four lanes	Kings County line to Elkhorn Avenue	18
Goshen to Kingsburg Six Lane Project	SR-99 between Kingsburg and Goshen, CA	19
SR-198 widen bridge to four lanes	Interchange at I-5	20
SR-198 widen to four lanes	SR-43 to SR-99	21
SR-198 interchange improvements	Road 148	22
Tulare Expressway Project	SR-198 and County Road 204, Tulare County	23
SR-65 widen to four lanes	Spruce	24
SR-99 improvements	Avenue 200 to Tipton	25
SR-190 passing lanes	SR-99 through SR-65	26
SR-65 widen to four lanes	Porterville	27
SR-99 Interchange upgrade	Woollomes Avenue	28
SR-46 widen to four lanes	San Luis Obispo County line to Holloway Road	29
SR-46 interchange upgrade	Holloway Road to I-5	30
SR-65 widen to four lanes	James Road to Merle Haggard Boulevard	31
SR-99 interchange upgrade	Olive Dr.	32

Project	Location	Figure 3-1 ID*
SR-58 widen to four lanes	SR-43 to Allen Road	33
SR-58 widen to six lanes; grade separation at Landco	Calloway Drive to SR-99	34
SR-58 widen to eight lanes	SR-99 to Cottonwood Road	35
SR-99 interchange construction	Hosking Avenue	36
*Note: ID 7 is a passenger rail project and is included in Figure 3-1 and discussed in 3.1.3.		

D.3 Aviation Element

The aviation element of the No Project Alternative consists of three airports that currently provide commercial service in the Fresno to Bakersfield Section study area. The existing aviation facilities (shown on Figure D-1) within the Fresno to Bakersfield Section are:

- **Fresno Yosemite International Airport (FAT)**, located is northeast of the city of Fresno, east of SR-41. The airport is owned by the City of Fresno and serves domestic flights and direct international flights (to Guadalajara, Mexico). It is the major air carrier airport in the Central San Joaquin Valley. The airport has two runways and a helipad.
- **Visalia Municipal Airport** is west of the city of Visalia, east of SR-99. The airport is owned by the City of Visalia serves domestic flights and, in 2008, served 1,704 passengers. The airport has one runway, one airline carrier with three flights per day to Ontario, California. The airport is currently in negotiations with another carrier and may announce new service. The new service would require the addition of 3,000 square feet of modular space for a hold room, with an eventual terminal expansion
- **Bakersfield Meadows Field Airport (BFL)** is north of Bakersfield and east of SR-99 and SR-65. Owned by Kern County, the airport serves two airline carriers with domestic flights. The airport has two runways, and in 2006 opened the new William M. Thomas Air Terminal. In 2008, BFL served 141,846 passengers.

The existing infrastructure is summarized in Table D-3. This information was gathered from existing airport master plans and interviews with airport officials.

Table D-3. Existing (2009) Airport Facilities

Airport	Total Passenger Terminal Size	Enplaned Passengers (annual) ¹	Percent of In-State Passengers	Number and Maximum Length of Runways	Number of Gates	Number of Parking Spaces	Size of Airport (acres)
Fresno Yosemite International Airport	147,000 square feet	600,070	60% ²	2; 9,227 ft	9	2,199	2,150
Visalia Municipal Airport	60 persons maximum	1,704	100%	1; 6,559 ft.	1	160	821
Bakersfield Meadows Field Airport	64,800 square feet	141,846	6% ³	2; 10,855 ft	5	1,009	1,400

Table D-3. Existing (2009) Airport Facilities

Airport	Total Passenger Terminal Size	Enplaned Passengers (annual) ¹	Percent of In-State Passengers	Number and Maximum Length of Runways	Number of Gates	Number of Parking Spaces	Size of Airport (acres)
Sources: 1. FAA, 2009a. 2. California High-Speed Rail Authority and USDOT Federal Railroad Administration, 2005. 3. Hitchcock, Teresa, 2009.							

Airport development is different from the highway and rail development in that it is not completely documented in RTPs or the STIP. Furthermore, because some airport improvements are funded by a combination of private and public sources, public documentation identifying confirmed airport projects that are likely to be in operation in 2035 is limited.

- To conceptualize a 2035 No Project Alternative airport system, proposed airport improvements were evaluated based upon a review of publicly available documentation; interviews with airport planning and development representatives; public agencies; and local area knowledge. An airport improvement was deemed likely to be implemented and in operation by 2035 if it met the following criteria: The improvement has been identified in an airport master planning program (either approved or under development), environmental document, regional aviation system planning document, or capital improvement program.
- The airport improvement would be funded and in place by 2035.

Table D-4 summarizes the airport improvements likely to be funded, programmed, and operational by 2035.

Table D-4. Programmed, Funded, and Operational Airport Improvements, by 2035

Airport	Passenger Terminal Size	Runways	Gates	Primary Access Lanes	Parking Spaces (On and Off Site)
Fresno Yosemite International Airport ¹	0	0	7	0	0
Visalia Municipal Airport ²	0	0	0	1	145
Bakersfield Meadows Field Airport	14,900 square feet	1 ³	21 ⁴	1 ³	701 ³
Sources: 1. Meikle, Kevin, 2009. 2. Cifuentes, Mario, 2009. 3. Bakersfield Meadows Field Airport (BFL) Airport Master Plan, December 2006. 4. Hitchcock, Teresa, 2009.					

D.4 Conventional Passenger Rail

Existing passenger rail service is provided within the Fresno to Bakersfield Section area by the Amtrak San Joaquin Route (Figure D-1). Amtrak's San Joaquin Route connects Bakersfield to the San Francisco

Bay Area and Sacramento, with stops in Wasco, Corcoran, Hanford, and Fresno within the study area. The service consists of six northbound and six southbound trains daily. In addition, four motor coach lines have connections to the Bakersfield Amtrak station, providing service to Palm Springs, Las Vegas, Los Angeles, and Santa Barbara. Amtrak shares the trackage with BNSF, which operates approximately 40 non-passenger trains per day between Bakersfield and Fresno.

The following California state documents were reviewed in developing the list of railroad improvement projects expected to be in operation by 2035:

- Traffic Congestion Relief Program project inventory, allocations, and cash flow, 2008.
- Comprehensive Statewide Interregional Transportation Improvement Plan Project List, 2008.
- California State Rail Plan, 2008.

The California State Rail Plan 2007/8 – 2017/18 (California Department of Transportation 2008) envisions an increase in service to eight daily roundtrips between Bakersfield and either Sacramento or Oakland by 2018. As envisioned, this service would carry 1,430,000 riders annually, with a 90 percent on-time performance, and a travel time from Bakersfield to Oakland of less than 6 hours. Table D-5 describes the programmed investments that will help achieve these improvements.

Funded and programmed improvements on the intercity and freight rail network are based on programmed funding lists from various sources. Only one system improvement is funded for the existing passenger rail route: The San Joaquin Route Project #92 (funding source: Traffic Congestion Relief Program) will improve track and signals along the San Joaquin intercity rail line near Hanford. Construction on this improvement began in May 2008 and is scheduled to be completed in May 2011.

Table D-5. Programmed Improvements in 2008 California State Rail Plan—Amtrak San Joaquin Route

Project Location	Project Type	Cost (\$000)
Hanford to Shirley	Track and Signal	10,000
Guernsey to Hanford	Track and Signal	36,000
Gregg Double Track – Fresno County	Track and Signal	22,500
Shafter to Jastro – Kern County	Track and Signal	40,000
Capitalized Maintenance	Track and Signal	10,000
Kings Park	Track and Signal	18,500
Fresno Layover Facility	Maintenance Facility/Equipment	15,000
Two sets (6 cars and 1 locomotive)	Maintenance Facility/Equipment	50,000
Source: Source: California Department of Transportation (2008).		

D.5 Local Development

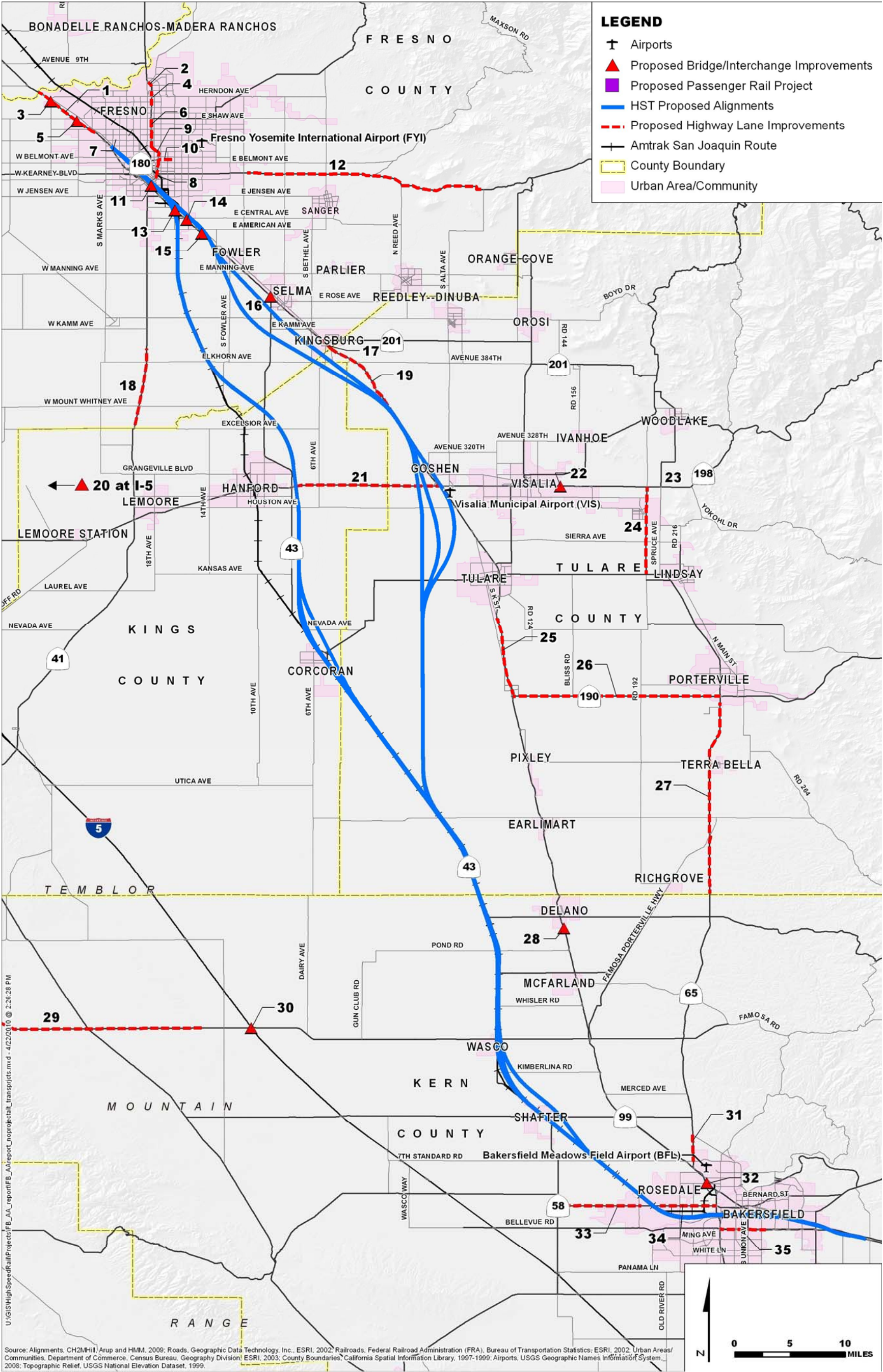
The local development element of the No Project Alternative consists of funded local and regional plans and/or development projects that would be located in or within one-quarter mile of the Fresno to Bakersfield alignment and stations.

Table D-6 summarizes the funded local development projects. Figure D-2 shows the location of these projects. Potential impacts of these planned developments on the HST, if any, are discussed in Section 3.3, Initial Development Project Alternatives.

Table D-6. Funded or Planned Local Developments within One-Quarter Mile of Alignment

Project	Location	Figure 3-2 ID
SR-99 interchange improvements	SR-99 at Merced Street	1
Ventura Boulevard widening	SR-41 to SR-99	2
Three Million Gallon Water Storage Tank	H Street and San Benito Street	3
Corcoran Police Station	West of Otis Avenue, north of Ross Court, South of Hanna Road	4
Wasco Rose City Enterprise Zone	SR-43 and SR-46, Kern County	5
North Shafter Sewer Project	Highway-43, Park Lane and Mettler Avenue, Tulare Avenue, Mayer Avenue	6
Rosedale Ranch Master Plan	Bakersfield	7
M&B Land Development	Hageman Road	8
Mill Creek Linear Park Plan	California Street, Q Street, and S Street	9

Figure D-2. No Project Alternative – Local Development Projects



APPENDIX E

Final Initial Screening Analysis

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APPENDIX E-1

Final Initial Screening Analysis – Fresno Area

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California High-Speed Train Project



Merced to Bakersfield EIR/EIS

ALTERNATIVES ANALYSIS REPORT

FINAL

INITIAL SCREENING MEMORANDUM - FRESNO AREA

Prepared by:

URS/HMM/Arup Joint Venture





August 25, 2009

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1.0 INTRODUCTION

This memorandum documents the Initial Screening of alternatives for the California High-Speed Train (CAHST) Project through Fresno, California. The screening process compares the extent to which a range of alternatives meets the purpose for the High-Speed Train (HST) Project, on the basis of engineering, operational and environmental criteria defined by the California High-Speed Rail Authority (Authority). The findings of this screening will be used to identify alternatives to carry forward for Preliminary Alternatives Analysis. The methodology, data sources and metrics used in the Initial Screening are consistent with the direction provided in the CAHST *Project Alternatives Analysis Methods for Project-Level Environmental Impact Report/Environmental Impact Statement (EIR/EIS) Technical Memorandum* (December 2008).

1.1 PROJECT BACKGROUND

The CAHST Project will provide intercity HST service over more than 800 route-miles throughout California, connecting the major population centers of Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego. The HST system is envisioned as a state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail network, including state-of-the-art safety, signaling, and automated train-control systems. The trains will be capable of operating at speeds of up to 220 miles per hour (mph) over a fully grade-separated alignment, with an expected express trip time between San Francisco and Los Angeles of 2 hours and 40 minutes.

1.1.1 Merced to Bakersfield Project EIR/EIS Background

The Authority has initiated project-level preliminary engineering and environmental review on eight individual sections of the statewide system. This study is a part of the engineering definition and environmental review of the HST system between Merced and Bakersfield, one of the eight segments of the system currently undergoing similar analyses:

- Sacramento to Merced
- San Jose to Merced
- San Francisco to San Jose
- Merced to Bakersfield
- Bakersfield to Palmdale
- Palmdale to Los Angeles
- Los Angeles to Anaheim
- Los Angeles to San Diego

With this study, the Authority will generate alternatives to be evaluated in detail during the environmental documentation for the HST system, under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). This memorandum focuses on HST alignment alternatives for the system through Fresno, including part of Madera County, and identifies criteria for their comparison and differentiation.

The Merced to Bakersfield HST Project EIR/EIS will tier from the Final Statewide Program EIR/EIS and the Final Bay Area to Central Valley HST Program EIR/EIS in accordance with Council on Environmental Quality regulations and State CEQA Guidelines based upon all previous work prepared for and incorporated in the Statewide Program EIR/EIS and the Bay Area to Central Valley HST Program EIR/EIS.

1.1.2 Study Area

The study area extends from just south of the city of Madera on the north end to just north of the city of Fowler on the south end. The eastern boundary is a line parallel to State Route 99, located approximately 3 miles to the east of State Route 99. The western boundary is an arc extending out to approximately 4.5 miles west of State Route 99. A map encompassing the study area is shown in Figure 1.

Local considerations for HST alignment in the Fresno study area include Roeding Park, Chinatown, the historic Southern Pacific Fresno station, Chukchansi Park, Fulton Mall, the Fresno Amtrak Station, Union Pacific Railroad (UPRR) Fresno Yard, and the Burlington Northern Santa Fe (BNSF) Calwa Yard.

1.2 ALTERNATIVES ANALYSIS PROCESS AND METHODOLOGY

The alternatives to be evaluated in the Project EIR/EIS for the Merced to Bakersfield region of the HST network will be defined via a two-step process, entailing an Initial Screening, followed by a Preliminary Alternatives Analysis.

The Initial Screening considers a broad range of alternatives, starting with the Preferred Alternative identified in the Program EIR/EIS for the state-wide HST network. Additional alternatives have been developed by the URS/HMM/Arup Joint Venture Technical Team with input from local stakeholders, that refine the Program EIR/EIS Preferred Alternative or that reflect a vital theme or concept, such as lowest travel time, alignment with another linear facility, or avoidance of known potential impacts. Other alternatives have been proposed via the public scoping process and are consistent with the HST project's Purpose and Need and system criteria.

The Initial Screening identifies major conflicts that may exist between the alternatives and considerations such as: existing or planned development, environmentally sensitive land uses, and physical constraints to HST operating speed. Some of these types of conflicts are immediately apparent via inspection of the study area and applicable maps and documents. The alternatives are further compared via a qualitative assessment of their relative impacts to the natural and man-made environments, the complexity of their construction and operation, and their fulfillment of HST system criteria. On the basis of the Initial Screening, a limited field of alternatives is suggested to advance to the Preliminary Alternatives Analysis.

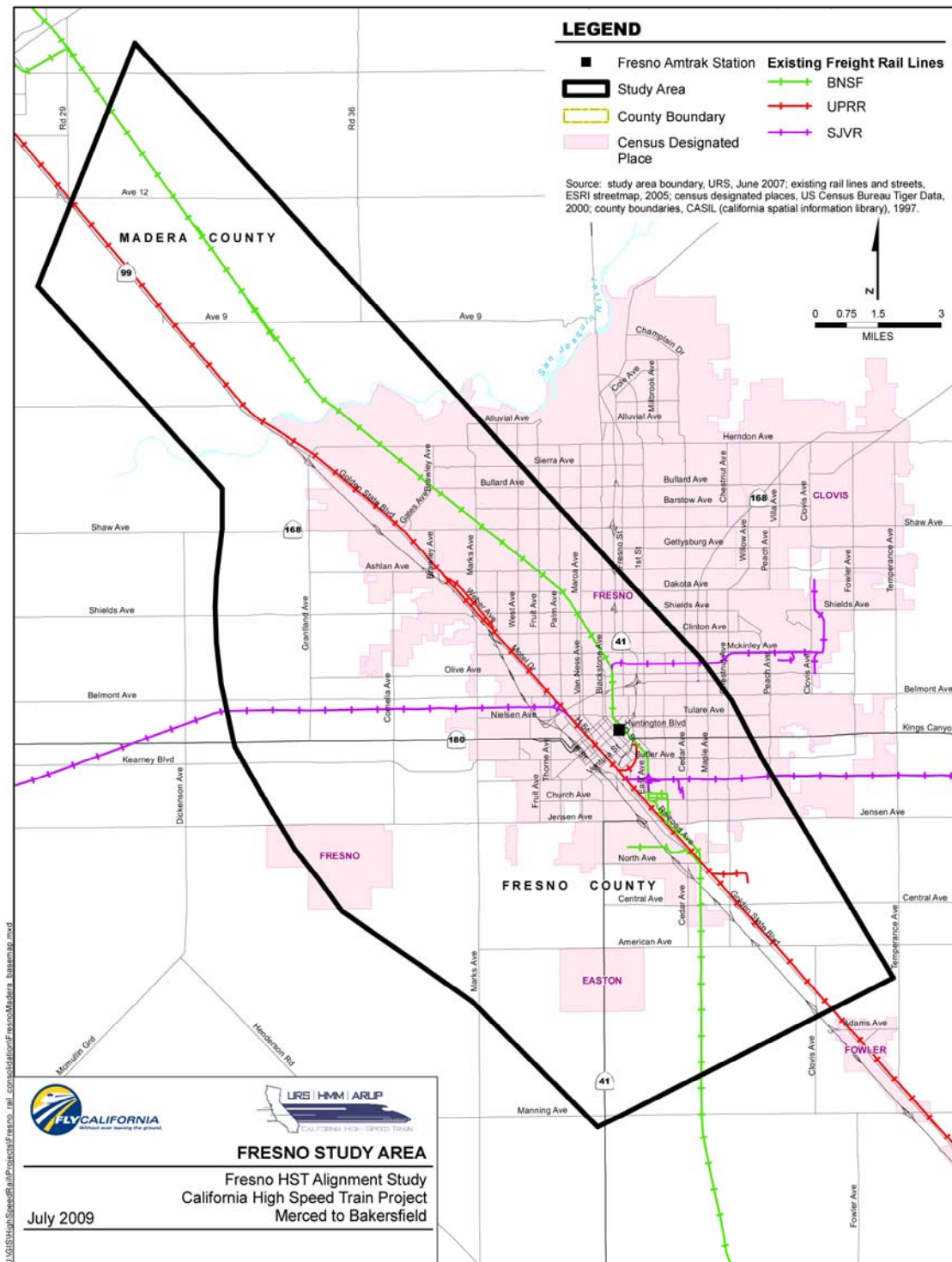
Alternatives have been initially screened using the criteria identified in Section 2.2. This Initial Screening may result in a number of alternatives being eliminated. At this point in the project, a follow-up consultation with stakeholders through a series of workshops with the public and the Authority/Federal Railroad Administration (FRA) will be used to brief them on the Initial Screening analysis and to solicit additional input and specifically for the Authority/FRA to seek approval to advance the alternatives into the Preliminary Alternatives Analysis.

After this Initial Screening, the remaining alternatives will be refined and subjected to a Preliminary Alternatives Analysis. The Preliminary Alternatives Analysis will compare the smaller field of refined alternatives on the basis of more detailed and quantitative metrics. Upon completion of the Preliminary Alternatives Analysis, the Authority will determine which alternatives should be carried forward for more detailed analysis during the project-level environmental documentation according to NEPA and CEQA guidelines.

1.3 PURPOSE OF THIS SCREENING MEMORANDUM

This Initial Screening Memorandum describes the metrics, data sources, and methodology used in the Initial Screening of Alternatives for HST through Fresno, and presents findings that support the selection of alternatives to be subjected to more detailed comparison in the subsequent Preliminary Alternatives Analysis. This Initial Screening evaluates the alternatives based on engineering, operational and environmental criteria defined by the Authority in the Authority's *Alternatives Analysis Methods for Project-Level EIR/EIS Technical Memorandum* (December 2008).

Figure 1
Fresno HST Initial Screening Study Area



The purpose of the Initial Screening is not to accurately quantify impacts associated with individual alternatives, but to broadly differentiate among alternatives on the basis of criteria that will be applied in greater detail in the EIR/EIS process.

The Initial Screening analysis begins with the Program EIR/EIS Preferred Alignment selected at the conclusion of the 2005 Final Statewide Program EIR/EIS process. Public and agency comments received during the Project EIR/EIS scoping process and during ongoing interagency coordination meetings, and direction from the Authority and FRA were used to identify initial alternatives to carry forward for Initial Screening. After identifying the initial alternatives, alignment plans, profiles, and cross-sections have been developed and used for the Initial Screening analysis.

The objectives of this memorandum are to document the Initial Screening process used to identify alternatives, and to identify those alternatives for which environmental issues (severe conflicts or constraints) or engineering constraints justify dropping them from further analysis. Alternatives are dropped from further consideration if they are not reasonable, practicable, and feasible. Major issues that could qualify an alternative to be dropped include:

- Alternative has environmental or engineering issues that would make approvals or implementation infeasible.
- Alternative produces unavoidable or difficult to mitigate environmental impacts.
- Alternative is not feasible or practicable to construct.

2.0 SCREENING CRITERIA

As defined in the Authority's *Alternatives Analysis Methods for Project-Level EIR/EIS Technical Memorandum* (December 2008), the alternatives were first defined by using system performance and design criteria to address the unique characteristics of HST operation. The alternatives were then subjected to the Initial Screening based on three general criteria also defined in the Authority's technical memorandum. This section outlines the HST Design Objectives and describes the development of Initial Screening criteria based on the Authority's guidance.

2.1 HST PERFORMANCE OBJECTIVES AND DESIGN CRITERIA

Initial alternative alignments and station locations have been developed to meet HST system performance objectives according to fundamental design criteria identified in Table 1.

Table 1
HST Performance Objectives and Design Criteria

Performance Objective	Design Criteria
Maximize ridership/revenue potential	<ul style="list-style-type: none">▪ Travel time▪ Route length▪ Speed
Maximize connectivity and accessibility	<ul style="list-style-type: none">▪ Intermodal connections
Minimize operating and capital costs	<ul style="list-style-type: none">▪ Construction, operations and maintenance issues and costs

Source: CAHST *Alternatives Analysis Methods for Project EIR/EIS Technical Memorandum* (December 2008)

2.2 INITIAL SCREENING CRITERIA

The Authority broadly defined the following three general criteria to be used in the Initial Screening of the Alternatives:

- Severe Constraints
- Conflicts with Existing Conditions
- Conflicts with Approved Future Development in the Study Area

Based on these three criteria categories, the Technical Team defined and developed more specific metrics that were used to evaluate relative impacts among alternatives, and particularly to identify key differentiators (Table 2). Whereas the metrics used for comparison are generally quantitative, they support a qualitative, narrative evaluation of the alternatives, summarized in Section 4.0.

Table 2
Initial Screening Criteria and Data Sources

Criterion	Metric	Source
SEVERE CONSTRAINTS		
Engineering complexity	Number of miles of alignment elevated, at-grade, and below-grade	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography
	Number of major waterways (river and canals) crossed by the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data
Limiting speed	Lowest operating speed at any point on the alignment	<ul style="list-style-type: none"> ▪ Concept drawings
Railroad right-of-way access	Number of miles of alignment that require shared use of freight railroad rights-of-way	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ Discussions with freight railroads (if possible)
Public right-of-way access	Number of miles of alignment that require shared use of Caltrans/highway rights-of-way	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ Discussions with Caltrans (if possible)
Railroad operations	Number of active railroad sidings that will be severed by the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ Discussions with freight railroads (if possible)
Operational safety	Location of the alternative relative to property or features that could endanger safe HST operation	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography
CONFLICTS WITH EXISTING CONDITIONS		
Land use impacts	Station located relative to the host cities' designated central business district	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ Local planning documents ▪ GIS data ▪ Input from local planning agencies

Table 2
Initial Screening Criteria and Data Sources

Criterion	Metric	Source
	Number of miles of the alignment that traverse agricultural (includes all definition of agricultural land) land	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data
Section 4(f) impacts	Number of Section 4(f) resources located within ¼-mile of the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data
Community impacts	Number of miles of alignment that traverse incorporated communities and census-designated places	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data ▪ County parcel data
	Number of census tracts of low income population (10% above the county established poverty line) within ¼-mile of the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data ▪ County parcel data
Property impacts	Number of agricultural parcels traversed by the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data ▪ County parcel data
	Number of residential parcels traversed by the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data ▪ County parcel data
	Number of commercial parcels traversed by the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data ▪ County parcel data
	Number of industrial parcels traversed by the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data ▪ County parcel data

Table 2
Initial Screening Criteria and Data Sources

Criterion	Metric	Source
Connectivity	Integration of the station site with the existing road and traffic network	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ Local planning documents ▪ Input from local planning agencies
	Integration of the station site with the existing transportation network	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ Local planning documents ▪ Input from local planning agencies
APPROVED FUTURE DEVELOPMENT IN THE STUDY AREA		
Land use impacts	Number of parcels planned for development (commercial, industrial and residential) traversed by the alignment	<ul style="list-style-type: none"> ▪ Regional and local planning documents and land use analysis ▪ Input from local planning agencies ▪ County parcel data ▪ GIS data
	Number of parcels planned for development (commercial, industrial and residential) impacted by the station footprint	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ Local planning documents ▪ Input from local planning agencies
Public and political support	Support for the alternative by regional/local plans and policies	<ul style="list-style-type: none"> ▪ Regional and local planning documents and land use analysis ▪ Input from local planning agencies

3.0 ALTERNATIVES CONSIDERED

The Fresno HST alignment alternatives considered in the Initial Screening include the Program EIR/EIS Preferred Alignment, alternatives developed by the Technical Team for this segment with local stakeholder input, and alternatives generated in response to public scoping.

3.1 ALIGNMENT ALTERNATIVES

A schematic of alternative HST alignments through the study area is shown in Figure 2. The alternatives are summarized in Table 3, including options applicable to one or more of the principal alternatives to address local issues or constraints.

3.1.1 Program EIR/EIS Preferred Alternative

The HST corridor through Fresno is a portion of the Merced to Bakersfield segment of the HST project, evaluated in the Program EIR/EIS as part of two separate alignment sections within the Sacramento-Bakersfield Study Area; Merced to Fresno and Fresno to Bakersfield. Through Fresno, the Preferred Alignment identified in the Program EIR/EIS is located generally alongside the BNSF rail alignment north and south of Fresno. At the north end of the study area, the Program EIR/EIS Preferred Alignment begins in Madera County, where it parallels the BNSF rail alignment before it crosses over to parallel the UPRR rail alignment starting just south of Herndon Avenue in Fresno. Through central Fresno, the Preferred Alignment parallels the UPRR rail alignment on its west side, but is not directly adjacent to the UPRR right-of-way. South of Fresno, the Preferred Alignment transitions from the UPRR to the BNSF between American and Jensen avenues.

The following alignment and station location were selected as the Preferred Alternative:

Alignment Alternative	Alignment Description	Station Location
Program EIR / EIS Preferred Alignment	Merced to Fresno: Transition from BNSF to UPRR at San Joaquin River crossing, west of and parallel to UPRR, south from Fresno downtown station,	Downtown Fresno
	Fresno to Bakersfield: From Fresno downtown station through central Fresno just west of UPRR right-of way, transition from UPRR to BNSF south of Fresno, BNSF rail alignment south to Bakersfield (Truxton Station).	

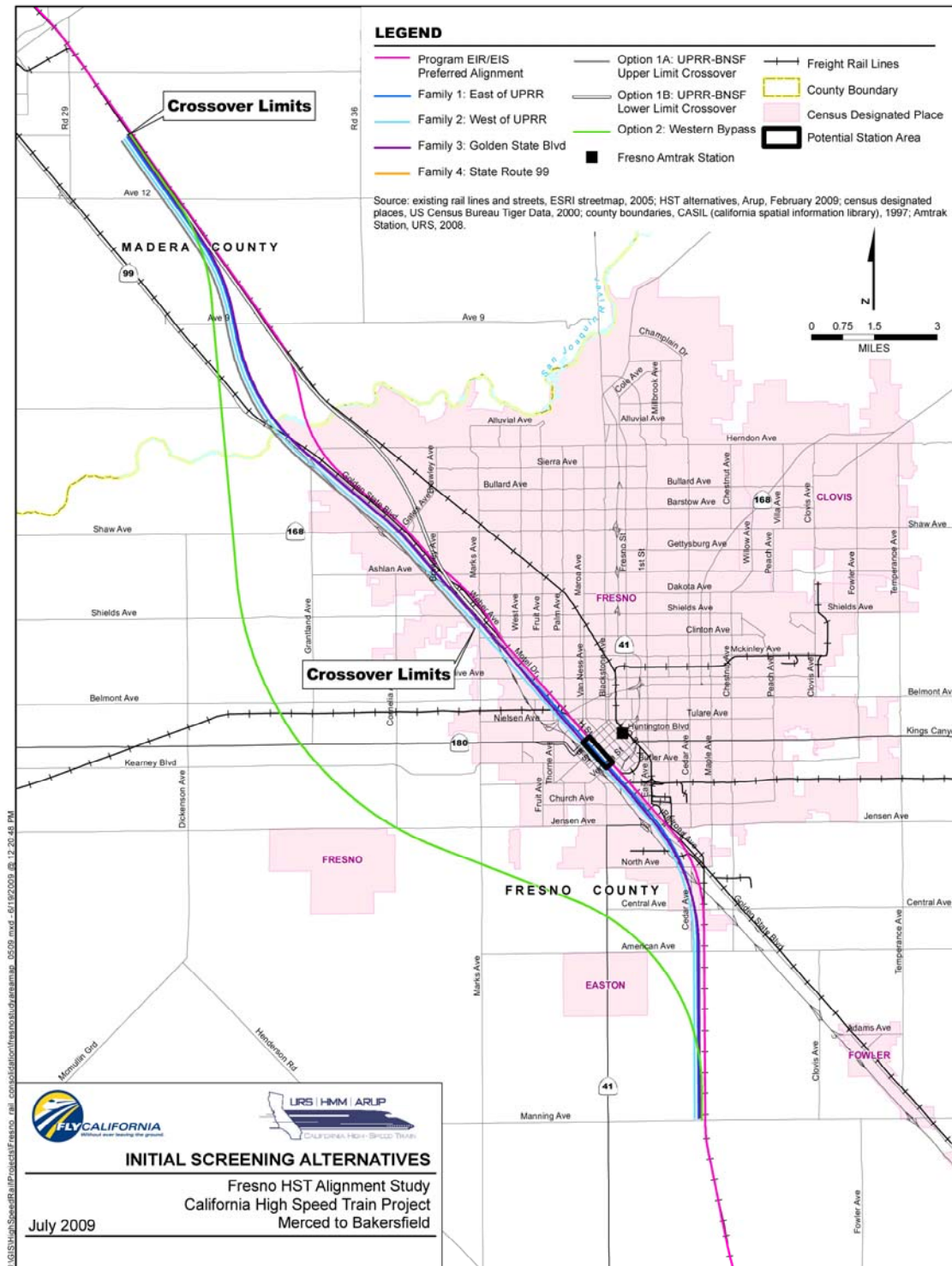
3.1.2 Stakeholder/Technical Team Generated Alternatives

The Technical Team for the Fresno study area, with input from the respective Technical Advisory Group (TAG) and from local stakeholders, generated four families of initial alternatives for the HST alignment through Fresno. These alternatives are based on the Program EIR/EIS Preferred Alternative in that they parallel the UPRR rail alignment through central Fresno, but reflect greater detail as to their relationship to other rights-of-way, fixed features and planned development.

- Alternative Family 1 – HST East of UPRR Right-of-Way
- Alternative Family 2 – HST West of UPRR Right-of-Way
- Alternative Family 3 – Golden State Boulevard
- Alternative 4 – State Route 99

The variants within these families all follow the same horizontal alignment; they appear identical in plan view as shown in Figure 2, but differ in vertical profile and cross-section. All are designed to the Authority's design speed of 250 mph, to enable trains to maintain maximum operating speed if they are not stopping at the Fresno downtown station.

Figure 2
Fresno Initial Screening Alternatives



Alternative Family 1 - HST East of UPRR Right-of-Way

This family of alternatives represents a variety of conditions that would exist if the HST system were built immediately adjacent to the east side of existing UPRR right-of-way through central Fresno, with a dedicated downtown station. Crossover alignments would transition between the BNSF rail alignments to the north and south of Fresno and the UPRR rail alignment through central Fresno. This family encompasses the following specific alternatives, differentiated by vertical profile through Fresno or by the vertical arrangement of station tracks:

- Alternative 1-1 – Elevated
- Alternative 1-2 – At-grade
- Alternative 1-3 – Below-grade
- Alternative 1-4 – Through tracks elevated, station tracks at-grade
- Alternative 1-5 – Through tracks below-grade, station tracks at-grade

The following characteristics apply to this alternative family:

- The HST alignment traverses from being adjacent to the BNSF to the UPRR rail alignment in the vicinity of the Madera-Fresno county line.
- UPRR occupies a north-south right-of-way no less than 100' in width through central Fresno.
- HST is constructed immediately adjacent to the existing UPRR right-of-way, on its east side.
- The HST alignment is built up to the right-of-way limits of the UPRR, with no spacing between the HST right-of-way and the UPRR right-of-way.
- The HST alignment traverses the UPRR Fresno Yard, between the UPRR mainline and the yard tracks. Alternative 1-3 is by definition tunneled from north of the UPRR Fresno Yard to south of downtown Fresno.
- A downtown Fresno HST station is located adjacent to the HST right-of-way on property between Stanislaus and Ventura streets, and State Route 99 and H Street; for Alternative 1-3 the station would be underground.
- A downtown Fresno station HST station location could serve Amtrak as well as high-speed trains were Amtrak operations re-routed to the adjacent UPRR corridor.
- Alternatives 1-4 and 1-5 incorporate 'stacked' cross-sections, with the station tracks at-grade and the through tracks either directly above or below them, to enable a narrower right-of-way.
- Key features in the immediate vicinity of this alternative family include:
 - the historic Southern Pacific Fresno station,
 - Chukchansi Park,
 - Fulton Mall,
 - UPRR Fresno Yard, and
 - BNSF Calwa Yard.

Alternative Family 2 - HST West of UPRR Right-of-Way

This family of alternatives represents a variety of conditions that would exist if the HST system were built immediately adjacent to the west side of the existing UPRR right-of-way through central Fresno, with a dedicated downtown station. Crossover alignments would transition between the BNSF rail alignments to the north and south of Fresno and the UPRR rail alignment through central Fresno. This family encompasses the following specific alternatives, differentiated by vertical profile through Fresno or by the vertical arrangement of station tracks. This family encompasses the following specific alternatives, differentiated by vertical profile through Fresno or by the vertical arrangement of station tracks:

- Alternative 2-1 – Elevated
- Alternative 2-2 – At-grade
- Alternative 2-3 – Below-grade

- Alternative 2-4 – Through tracks elevated, station tracks at-grade
- Alternative 2-5 – Through tracks in below-grade, station tracks at-grade

The following characteristics apply to this alternative family:

- The HST alignment traverses from being adjacent to the BNSF to the UPRR rail alignment in the vicinity of the Madera-Fresno county line.
- UPRR occupies a north-south right-of-way no less than 100' in width through central Fresno.
- HST is constructed immediately adjacent to the existing UPRR right-of-way, on its west side.
- The HST alignment is built up to the right-of-way limits of the UPRR, with no spacing between the HST right-of-way and the UPRR right-of-way.
- The alignment traverses the eastern margin of Roeding Park, either on aerial structure or below-grade.
- A downtown Fresno HST station is located adjacent to the HST right-of-way on property between Stanislaus and Ventura streets, and State Route 99 and H Street; for Alternative 2-3 the station would be underground.
- A downtown Fresno HST station location could serve Amtrak as well as high-speed trains were Amtrak operations re-routed to the adjacent UPRR corridor.
- Alternatives 1-4 and 1-5 incorporate 'stacked' cross-sections, with the station tracks at-grade and the through tracks either directly above or below them, to enable a narrower right-of-way.
- Key features in the immediate vicinity of this alternative family include:
 - Roeding Park,
 - Chinatown,
 - the historic Southern Pacific Fresno station,
 - UPRR Fresno Yard, and
 - BNSF Calwa Yard.

Alternative Family 3 - Golden State Boulevard

This family of alternatives makes use of the current alignment of Golden State Boulevard, on the west side of the UPRR corridor. Going from north to south, the HST alignment would follow the BNSF rail alignment until crossing over the San Joaquin River to the Golden State Boulevard right-of-way. The HST alignment would then proceed south through Roeding Park and Chinatown either below-grade via a tunnel, or elevated on elevated structure. The HST alignment would continue south and depart the Golden State Boulevard right-of-way at about Church Avenue and proceed south along the BNSF rail alignment in the vicinity of Cedar Avenue. This family encompasses the following specific alternatives, differentiated by vertical profile through Fresno:

- Alternative 3-1 – Elevated
- Alternative 3-2 – Below-grade

The following characteristics apply to this alternative family:

- The HST alignment traverses from the BNSF rail alignment to the Golden State Boulevard in the vicinity of the Madera-Fresno county line.
- HST alignment follows Golden State Boulevard through central Fresno, west of the UPRR corridor.
- The HST traverses Roeding Park on elevated structure, or underground.
- This alternative requires a dedicated HST station in central Fresno, either elevated or underground.
- The alignment approaches the vicinity of Ashlan Avenue from the north along Golden State Boulevard, or from the northwest along State Route 99.
- Key features in the immediate vicinity of this alternative family include:

- Roeding Park, and
- Chinatown.

Alternative 4 - State Route 99

This alternative makes use of the alignment of State Route 99, on the west side of the UPRR corridor. Going from north to south, the HST alignment would run parallel the BNSF rail alignment to the San Joaquin River and swing slightly west continuing along the State Route 99 right-of-way. Where the State Route 99 swings west to bypass Roeding Park, the HST alignment would stay elevated through Roeding Park, maintaining its 250 mph design speed. The HST alignment would proceed south in the State Route 99 right-of-way on elevated structure through central Fresno and transition to the BNSF rail alignment in the vicinity of Cedar Avenue.

- The HST alignment traverses from being adjacent to the BNSF to the UPRR rail alignment in the vicinity of the Madera-Fresno county line.
- In the vicinity of Ashlan Avenue the alignment continues south along Golden State Boulevard, or swings west to continue north along State Route 99.
- HST alignment follows State Route 99 through central Fresno, west of the UPRR corridor.
- This alternative requires a dedicated, elevated HST station in central Fresno.
- Where State Route 99 curves west to bypass Roeding Park, the HST would continue on elevated structure through Roeding Park to maintain 250 mph design speed.
- Key features in the immediate vicinity of this alternative include:
 - Roeding Park, and
 - Chinatown.

3.1.3 Options Applicable to all Alternatives

Three options that are applicable to all of the alternatives were also evaluated using the same criteria used in the Initial Screening of the Alternatives. These three options are:

- Northern Transition: Option OP 1-A - UPRR-BNSF Upper Limit Crossover
- Northern Transition: Option OP 1-B - UPRR-BNSF Lower Limit Crossover
- Western Bypass: Option OP 2

Northern Transition (OP 1-A and OP 1-B)

Figure 2 illustrates an issue common to all families of alternative alignments through Fresno. At the north end of the study area, the HST alignment would cross over from adjacent to the BNSF to the UPRR rail alignment within an area demarcated by northern and southern crossover options, known as the Northern Transition area. The northern boundary of the area would place the crossover north of the San Joaquin River, resulting in impacts to agricultural land in Madera County. Crossing over at the southern boundary of the area would place the crossover south of the San Joaquin River and the Madera-Fresno county line, resulting in impacts to existing residential development in Fresno. While the HST line will require a new, dedicated river crossing, either of the options at the boundaries of the area would encompass a new crossing adjacent to either of the existing freight railroad bridges. An alignment between these two extremities would require an HST bridge in a new, unique location. The ultimate location of the HST crossover will necessarily be determined via discussions and agreement among the two counties and the High-Speed Rail Authority.

These Northern Transition options were developed by the Stakeholder/Technical Team in response to concerns raised during TAG meetings and discussions with local stakeholders, and apply to all of the families of alternatives. They reflect the northern and southern extremes of the area through which the

HST would transition from generally paralleling the BNSF rail alignment in Madera County to the UPRR rail alignment through central Fresno. They are differentiated by the counties in which the crossover occurs, either in Madera or Fresno counties. These Northern Transition options are defined as:

- **Option OP 1-A – UPRR-BNSF Upper Limit Crossover:** This option locates the crossover entirely in Madera County. It starts by paralleling the BNSF rail alignment and proceeds westerly to the vicinity of the San Joaquin River, where it continues along Golden State Boulevard to Ashlan Avenue.
- **Option OP 1-B – UPRR-BNSF Lower Limit Crossover:** This option locates the crossover entirely in Fresno County. It starts by paralleling the BNSF rail alignment and proceeds westerly in the vicinity of Herndon Avenue to Ashlan Avenue.

Western Bypass (OP 2)

This option also applies to all of the alternatives, and was developed by the Technical Team in response to comments received during public and agency scoping. This option illustrates potential means for reducing the impacts of freight and passenger operations through central Fresno by (a) routing through high-speed trains around Fresno via a bypass, (b) enabling narrower, lower-speed, and more flexible HST right-of-way to be aligned through central Fresno, and (c) creating a corridor that could accommodate the relocation of either BNSF or UPRR freight traffic on a western bypass. This desire has been articulated by the Council of Fresno County Governments and the City of Fresno, and is the subject of a concurrent study funded with local sales tax revenue.

- **Option OP 2 – Western Bypass:** The Western Bypass option would route the alignment for HST trains not stopping in Fresno on a bypass to the west of central Fresno. HST trains not stopping at Fresno could normally use the bypass, and HST trains stopping in Fresno would be routed through central Fresno, stopping at the Fresno station.

Bypasses of Fresno were eliminated from consideration in the Program EIR/EIS in response to concerns about farmland impacts and capital costs. However, a bypass option is being reconsidered in this Initial Screening Memorandum to respond to interest and scoping comments from the City of Fresno, Council of Fresno County Governments and the community in consolidating multiple railroads through central Fresno, which was not considered in the Program EIR/EIS. The bypass option may also enable provision of a station served by both HST and Amtrak trains and expansion of freight railroad capacity.

To maintain HST service speed and travel times, HST tracks on a bypass would be built to the specified 250 mph design speed. Because station tracks through central Fresno would accommodate only trains stopping at a downtown station, they would allow lower operating speeds, allowing more flexible geometry that may enable lesser impacts on existing and planned development.

**Table 3 – Merced to Bakersfield (Fresno Study)
Alternatives and Options for Initial Screening**

Alternative/Option Number	Description	Origin	Scope	Predominant Profile	Station Location	Theme / Comments
Program EIR/EIS Preferred Alignment	Merced - Fresno	Program EIR/EIS	Full Alignment Alternative	At-Grade	Downtown Fresno	Transition from BNSF to UPRR at San Joaquin River crossing, west of and parallel to UPRR, south from Fresno downtown station,
	Fresno - Bakersfield			At-Grade		From Fresno downtown station through central Fresno just west of UPRR right-of way, transition from UPRR to BNSF south of Fresno, BNSF rail alignment south to Bakersfield (Truxton Station).
Alternative Family 1 HST East of UPRR	Alternative 1-1 Elevated Through Central Fresno	Technical Team / TAG	Full Alignment Alternative	Elevated Through Central Fresno	Downtown Fresno	HST adjacent to UPRR on the immediate east side of UPRR right-of-way. Through and station tracks on elevated structure through central Fresno to reduce certain ground level conflicts and impacts. Station platforms elevated. Alignment traverses through the UPRR Fresno Yard and historic Southern Pacific Fresno station.
	Alternative 1-2 At-Grade Through Central Fresno	Technical Team / TAG	Full Alignment Alternative	At-Grade Through Central Fresno	Downtown Fresno	HST adjacent to existing UPRR right-of-way on the east side of UPRR. Through and station tracks at-grade through central Fresno. Station platforms at-grade. Alignment traverses through the UPRR Fresno Yard and historic Southern Pacific Fresno station.
	Alternative 1-3 Below-Grade Through Central Fresno	Technical Team / TAG	Full Alignment Alternative	Below-Grade Through Central Fresno	Downtown Fresno	HST adjacent to existing UPRR right-of-way on the east side of UPRR. Through and station tracks below-grade through central Fresno to reduce certain ground level conflicts and impacts. Station platforms below-grade.
	Alternative 1-4 Through Tracks Elevated; Station Tracks at-Grade	Technical Team / TAG	Full Alignment Alternative	Through Tracks Elevated; Station Tracks at-Grade	Downtown Fresno	HST adjacent to existing UPRR right-of-way on the east side of UPRR. Through tracks on elevated structure above at-grade station tracks through central Fresno, to minimize cross-sectional width of HST right-of-way and reduce certain ground level conflicts and impacts. Station platforms at-grade. Alignment traverses through the UPRR Fresno Yard and historic Southern Pacific Fresno station.
	Alternative 1-5 Through Tracks Below-Grade; Station Tracks at-Grade	Technical Team / TAG	Full Alignment Alternative	Through Tracks Below-Grade; Station Tracks at-Grade	Downtown Fresno	HST adjacent to existing UPRR right-of-way on the east side of UPRR. Station tracks at-grade above through tracks below-grade, to minimize cross-sectional width of HST right-of-way and reduce certain ground level conflicts and impacts. Station platforms at-grade. Alignment traverses through the UPRR Fresno Yard and historic Southern Pacific Fresno station.

**Table 3 – Merced to Bakersfield (Fresno Study)
Alternatives and Options for Initial Screening**

Alternative/Option Number	Description	Origin	Scope	Predominant Profile	Station Location	Theme / Comments
Alternative Family 2 HST West of UPRR	Alternative 2-1 Elevated Through Central Fresno	Technical Team / TAG	Full Alignment Alternative	Elevated Through Central Fresno	Downtown Fresno	HST adjacent to existing UPRR right-of-way on the west side of UPRR. Through and station tracks on elevated structure through central Fresno to reduce certain ground level conflicts and impacts. Station platforms elevated.
	Alternative 2-2 At-Grade Through Central Fresno	Technical Team / TAG	Full Alignment Alternative	At-Grade Through Central Fresno	Downtown Fresno	HST adjacent to existing UPRR right-of-way on the west side of UPRR. Through and station tracks at-grade through central Fresno. Station platforms at-grade.
	Alternative 2-3 Below-Grade Through Central Fresno	Technical Team / TAG	Full Alignment Alternative	Below-Grade Through Central Fresno	Downtown Fresno	HST adjacent to existing UPRR right-of-way on the west side of UPRR. Through and station tracks below-grade through central Fresno to reduce certain ground level conflicts and impacts. Station platforms below-grade.
	Alternative 2-4 Through Tracks Elevated; Station Tracks at-Grade	Technical Team / TAG	Full Alignment Alternative	Through Tracks Elevated; Station Tracks at-Grade	Downtown Fresno	HST adjacent to existing UPRR right-of-way on the west side of UPRR. Through tracks on elevated structure above at-grade station tracks through central Fresno, to minimize cross-sectional width of HST right-of-way and reduce certain ground level conflicts and impacts. Station platforms at-grade.
	Alternative 2-5 Through Tracks Below-Grade; Station Tracks at-Grade	Technical Team / TAG	Full Alignment Alternative	Through Tracks Below-Grade; Station Tracks at-Grade	Downtown Fresno	HST adjacent to existing UPRR right-of-way on the west side of UPRR. Station tracks at-grade above through tracks below-grade, to minimize cross-sectional width of HST right-of-way and reduce certain ground level conflicts and impacts. Station platforms at-grade.
Alternative Family 3 Golden State Boulevard	Alternative 3-1 Elevated Through Central Fresno	Technical Team / TAG	Full Alignment Alternative	Elevated Through Central Fresno	Downtown Fresno	HST in or adjacent to alignment of Golden State Boulevard, to the west and independent of UPRR rail alignment. Elevated structure through Roeding Park. Through and station tracks elevated through the central business district via Chinatown district. Station platforms elevated.
	Alternative 3-2 Below-Grade Through Central Fresno	Technical Team / TAG	Full Alignment Alternative	Below-Grade Through Central Fresno	Downtown Fresno	HST in or adjacent to alignment of Golden State Boulevard, to the west and independent of UPRR rail alignment. Below-grade through Roeding Park. Through and station tracks below-grade through the central business district via Chinatown district. Station platforms below-grade.

**Table 3 – Merced to Bakersfield (Fresno Study)
Alternatives and Options for Initial Screening**

Alternative/Option Number	Description	Origin	Scope	Predominant Profile	Station Location	Theme / Comments
Alternative 4 State Route 99	Alternative 4 Elevated Through Central Fresno	Technical Team / TAG	Full Alignment Alternative	Elevated Through Central Fresno	Downtown Fresno	HST in or adjacent to alignment of State Route 99, to the west and independent of UPRR rail alignment. Elevated structure through Roeding Park. Through and station tracks elevated through the central business district. Station platforms elevated.
Option Family 1 Northern Transition	Option OP 1-A UPRR-BNSF Upper Limit Crossover (Within Madera County)	Technical Team / TAG	Local Option; Applicable to all Full Alternatives	At-Grade	N/A	Splits from the BNSF rail alignment in the vicinity of the San Joaquin River, whence it crosses southwesterly to the UPRR rail alignment. Crossover routed via County of Madera with land principally in agricultural use.
	Option OP 1-B UPRR-BNSF Lower Limit Crossover (Within Fresno)	Technical Team / TAG	Local Option; Applicable to all Full Alternatives	At-Grade	N/A	Splits from the BNSF rail alignment in the vicinity of Ashlan Avenue, whence it crosses southwesterly to the UPRR rail alignment. Crossover routed via City of Fresno with land principally in residential use.
Option 2 Western Bypass	OP 2 Western Bypass (for trains not stopping in Fresno)	Public Scoping / Agency Comments	Option; Applicable to all Full Alternatives	At-Grade	N/A	2-track 250-mph bypass to the west of Fresno, principally via agricultural land. Through trains operate via bypass, trains serving Fresno access Downtown station via 2-track <110 mph station tracks. Enables smaller downtown footprint than all through/station alternatives, and more flexible track geometry for station tracks. Evaluation of Western Bypass specifically called for by Fresno city, county and private stakeholders.

3.2 PRELIMINARY STATION LOCATIONS

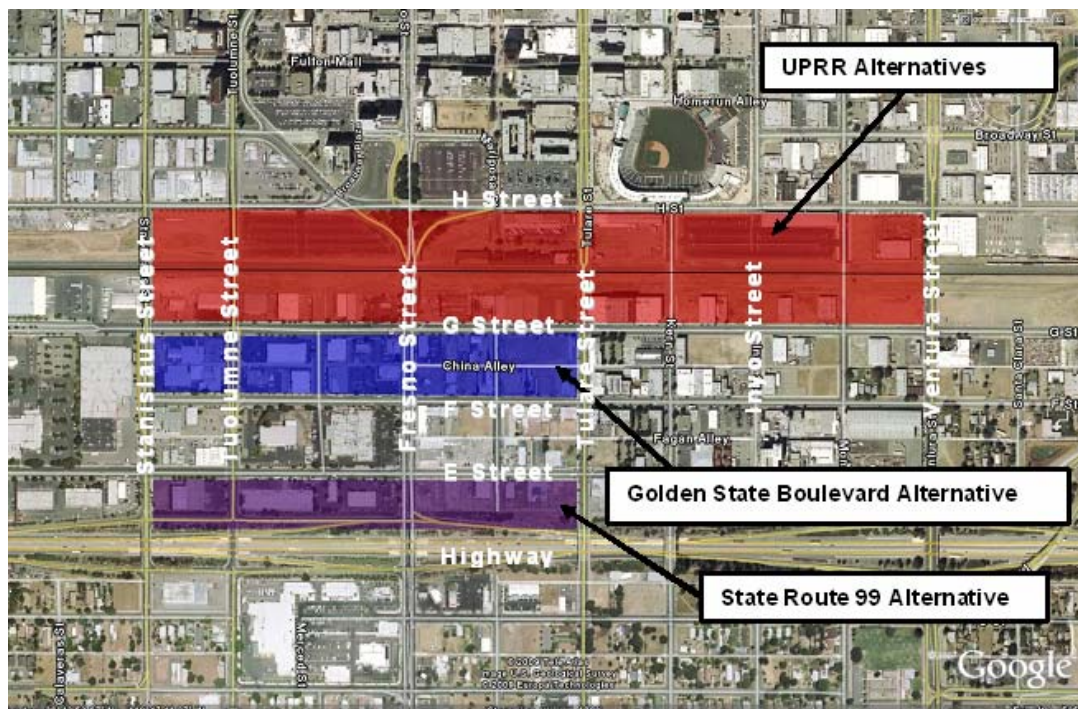
Initial investigations and discussions with representatives of the City of Fresno have determined a Station Investigation Area for each HST alignment alternative. These areas meet the connectivity and accessibility design objectives outlined in Section 2.1.

The Station Investigation Area for each alignment alternative is defined below and illustrated in Figure 3. The actual footprint of the station is expected to be approximately 200,000 square feet, depending on the program elements and height of the facility.

Station Investigation Areas

- Alternative Family 1: HST East of the UPRR, between Stanislaus Street, H Street, Inyo Street and G Street
- Alternative Family 2: HST West of the UPRR, between Stanislaus Street, H Street, Inyo Street and G Street
- Alternative Family 3: Golden State Boulevard, between Stanislaus Street, G Street, Tulare Street and F Street
- Alternative 4: State Route 99, between Stanislaus Street, E Street, Tulare Street and State Route 99

Figure 3
Downtown Fresno Station Investigation Areas



Source: Google Earth

4.0 INITIAL SCREENING RESULTS AND CONCLUSIONS

This section presents the analysis of the initial screening of the alternatives. Each of the alternatives is discussed in response to the evaluation criteria, with pros and cons, major concerns, a conclusion and

suggested disposition of the alternative. Station locations are defined and evaluated as integral parts of the alternatives and are addressed in the respective descriptions and discussions of the alternatives.

4.1 OBJECTIVE AND PROCESS

The evaluation process resulted in the population of a matrix that tabulates the metrics of each alternative and option according to the criteria presented in Table 4. The complete summary of the Initial Screening is presented in matrix form as Appendix A. The numeric scores with which the matrix is populated have been reviewed and the range of scores for each criterion parsed into ranges of generally high, medium and low impact, the lower range being preferable to the higher range. These ranges and the scores of each alternative illuminate both (a) gross differentiators among the alternatives and (b) the relative impacts of all the alternatives and options. These ranges and differentiators are the basis for narrative discussion of the alternatives and their further consideration in the Preliminary Alternative Analysis.

Table 4
Initial Screening Criteria and Scoring Ranges

Criterion	Metric	Scoring Range
SEVERE CONSTRAINTS		
Engineering complexity	<u>Number of miles</u> of alignment elevated, at-grade, and below-grade	<ul style="list-style-type: none"> High impact Medium impact Low impact
	<u>Number of major waterways</u> (river and canals) crossed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
Limiting speed	<u>Lowest operating speed</u> at any point on the alignment	<ul style="list-style-type: none"> < 219 mph 220 – 249 mph > 250
Railroad right-of-way access	<u>Number of miles</u> of alignment that require shared use of freight railroad rights-of-way	<ul style="list-style-type: none"> High impact Medium impact Low impact
Public right-of-way access	<u>Number of miles</u> of alignment that require shared use of Caltrans/highway rights-of-way	<ul style="list-style-type: none"> High impact Medium impact Low impact
Railroad operations	<u>Number of active railroad sidings</u> that will be severed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
Operational safety	Does the alternative traverse property or features that could <u>endanger safe HST operation</u> ?	<ul style="list-style-type: none"> Yes Unable to determine No
CONFLICTS WITH EXISTING CONDITIONS		
Land use impacts	Is the station located in the cities' designated <u>central business district</u> ?	<ul style="list-style-type: none"> No Unable to determine Yes

Table 4
Initial Screening Criteria and Scoring Ranges

Criterion	Metric	Scoring Range
	<u>Number of miles</u> of the alignment that traverse agricultural (includes all definition of agricultural land) land	<ul style="list-style-type: none"> High impact Medium impact Low impact
Section 4(f) impacts	<u>Number of Section 4(f) resources</u> located within ¼-mile of the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
Community impacts	<u>Number of miles</u> of alignment that traverse incorporated communities and census-designated places	<ul style="list-style-type: none"> High impact Medium impact Low impact
	<u>Number of census tracts</u> of low income population (10% above the county established poverty line) within ¼-mile of the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
Property impacts	<u>Number of agricultural parcels</u> traversed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
	<u>Number of residential parcels</u> traversed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
	<u>Number of commercial parcels</u> traversed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
	<u>Number of industrial parcels</u> traversed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
Connectivity	How well does the station site mesh with the <u>existing road and traffic network</u> ?	<ul style="list-style-type: none"> Poorly Average Well
	How well does the station site mesh with the <u>existing transportation network</u> ?	<ul style="list-style-type: none"> Poorly Average Well
APPROVED FUTURE DEVELOPMENT IN THE STUDY AREA		
Land use impacts	<u>Number of parcels</u> planned for development (commercial, industrial and residential) traversed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
	<u>Number of parcels</u> planned for development (commercial, industrial and residential) impacted by the station footprint	<ul style="list-style-type: none"> High impact Medium impact Low impact
Public and political support	Is the alternative supported by <u>regional/local plans and policies</u> ?	<ul style="list-style-type: none"> No Unable to determine Yes

4.2 ALTERNATIVE SCREENING FINDINGS

4.2.1 Program EIR/EIS Preferred Alignment

Pros

- Relatively low engineering complexity because a majority of the alignment is at-grade, less complex than elevated or below-grade construction.
- The alignment achieves the design speed of 250 mph.
- At this time, the alignment does not appear to traverse property or have features that could endanger the safe operations of high speed trains.
- Among the alternatives being screened, this alignment has among the lowest in terms of residential parcels, commercial parcels and parcels planned for development impacts.
- The station is located within ¼-mile of the central business district as defined by the City of Fresno and within the standard transportation planning guideline for walkability (¼-mile or approximately 10 minutes).
- The station location is well connected to the roadway network and is among the lowest in terms of parcels planned for development impacted by the station footprint.
- The alignment responds to local and regional plans and policies that recommend HST serve a downtown station location.

Cons

- The alignment crosses the UPRR near the BNSF Calwa Yard and through UPRR Fresno Yard. UPRR has sent a letter (April 8, 2009) to the Authority stating "we will not voluntarily make these or any part of the Fresno subdivision available for the high-speed rail alignment." Therefore, this is a concern since UPRR will not allow the use of their right-of-way.
- Highways 99, 41, and 180 are crossed on elevated structure that could be as high as 90'-100'.
- The alignment severs a number of active rail sidings and rail operations such as the San Joaquin Valley Railroad and the UPRR Fresno Yard. An alignment at-grade beneath Hwy 180 would sever the San Joaquin Valley Railroad. To retain the San Joaquin Valley Railroad a 3-tier grade separation would be required. Similarly at the south access to UPRR Fresno Yard a 3-tier grade separation would be required to maintain yard access. These would be difficult to construct whilst maintaining UPRR operations.
- Among the alternatives being screened, this alignment is among the highest in terms of proximity to Section 4(f) properties.
- The alignment traverses Roeding Park, a Section 4(f) property. There are other alternatives that avoid Roeding Park.
- Potential conflict with San Joaquin River Parkway and Conservation Trust public property, a Section 4(f) property.
- Among the alternatives being screened, this alignment is among the highest in terms of agricultural parcels impacted and moderate in terms of industrial parcels impacted.
- The alignment traverses mainly incorporated communities and/or census designated places thus potentially severing communities and impacting community cohesiveness.
- The alignment traverses numerous low-income census tracts, thus potentially creating an issue of environmental justice for the placement of the alignment.
- The station location would require street closures or grade separation, is located west of the UPRR, requiring crossing of an active main line to reach the downtown and is approximately 1/3-mile from the downtown Transit Mall.

Major Concerns

- UPRR will not allow use of their right-of-way and the alternative crosses the UPRR Fresno Yard.
- The Program EIR/EIS Preferred Alignment traverses through Roeding Park, a Section 4(f) property.

Conclusion

The Program EIR/EIS Preferred Alignment has two major concerns: (a) UPRR will not allow the use of their right-of-way for a high speed train system and (b) The alignment also traverses through Roeding Park, a Section 4(f) property. Other alternatives, particularly those in Alternative Family 2 – HST West of UPRR, fulfill the intent of the Program EIR/EIS Preferred Alignment with better adherence to the Project criteria and with fewer impacts.

Therefore, it is suggested that this alternative be eliminated from further screening and analysis.

4.2.2 Alternative Family 1 – HST East of UPRR Right-of-Way

Pros

- Low engineering complexity for Alternative 1-2 because the majority of the alternative is at-grade, considered less complex than elevated or below-grade.
- The family of alternatives achieves the design speed of 250 mph.
- Alternative 1-3 is below-grade through Central Fresno, avoiding at-grade conflicts with the historic Southern Pacific Fresno station and the UPRR Fresno Yard.
- This family of alternatives does not appear to traverse property or have features that could endanger the safe operations of high speed trains.
- Among the alternatives screened, Alternatives 1-1 and 1-3 are among the lowest in terms of active rail sidings severed.
- Among the alternatives being screened, Alternative 1-3 is among the lowest in terms of proximity to Section 4(f) properties.
- Alternatives 1-3 and 1-5 traverse fewer incorporated communities and/or census designated places than other alternatives within the family, thus potentially severing fewer communities and fewer impacts to community cohesiveness.
- This family of alternatives traverses few low-income census tracts, thus potentially reducing the risk of environmental justice issues.
- Among the alternatives being screened, Alternative 1-5 is among the lowest in terms of agricultural parcels impacted.
- Among the alternatives being screened, this family of alternatives is among the lowest in terms of commercial parcels, industrial parcels, and parcels planned for development impacted.
- The station is located within ¼-mile of the central business district as defined by the City of Fresno and within the standard transportation planning guideline for walkability (¼-mile or approximately 10 minutes).
- The station location is well connected to the roadway network and is among the lowest in terms of parcels planned for development impacted by the station footprint.
- The station location is east of the UPRR, not requiring crossing of an active main line to reach the downtown and is approximately 1/3-mile from the downtown Transit Mall.
- The alternative responds to local and regional plans and policies that recommend HST serve a downtown station location.

Cons

- Medium to high engineering complexity for Alternatives 1-1, 1-3, 1-4, and 1-5 due to a majority of the alternative being elevated or below-grade, considered more complex than at-grade.
- For this alternative family, the long skewed crossing north of BNSF Calwa Yard would be logistically complex to construct as the northern abutment would be between the UPRR and BNSF mainlines.
- The crossing of the existing grade-separated junctions for Alternatives 1-1 and 1-4 would require an approximately 60' high HST viaduct. The spacing of the junctions may prevent the alignment from dropping to ground level between junctions. Constructing a viaduct through the UPRR Fresno Yard while maintaining yard operations would be difficult.

- Alternatives 1-1, 1-2, 1-4 and 1-5 cross the UPRR near the Calwa Yard and traverse the UPRR Fresno Yard. UPRR has sent a letter (April 8, 2009) to the Authority stating "we will not voluntarily make these or any part of the Fresno subdivision available for the high-speed rail alignment." Therefore, this is a concern since UPRR will not allow the use of their right-of-way.
- Highways 99, 41, and 180 are crossed on elevated structure that could be as high as 90'-100'.
- Among the alternatives being screened, Alternatives 1-2, 1-4 and 1-5 are among the highest in terms of active rail sidings severed, including severance of the UPRR Fresno Yard and the San Joaquin Valley Railroad.
- Extreme difficulty to construct below-grade through UPRR Fresno Yard while maintaining UPRR operations for Alternatives 1-3 and 1-5. Below-grade construction beneath existing bridges is highly complex.
- Among the alternatives being screened, Alternatives 1-1, 1-2, 1-4 and 1-5 are among the highest in terms of proximity to Section 4(f) properties.
- Alternatives 1-1, 1-2, 1-4 and 1-5 traverse the site of the historic Southern Pacific Fresno station (National Register and City of Fresno historic listing), a Section 4(f) property.
- Potential conflict with San Joaquin River Parkway and Conservation Trust public property, a Section 4(f) property.
- A majority of Alternatives 1-1, 1-2 and 1-4 traverses incorporated communities and/or census designated places thus potentially severing communities and impacting community cohesiveness.
- Alternatives 1-1, 1-2, 1-4 and 1-5 traverse a number of low income census tracts, thus potentially creating environmental justice issues.
- Among the alternatives being screened, Alternatives 1-1, 1-2, 1-3 and 1-4 are among the highest in terms of agricultural parcels impacted.
- Among the alternatives being screened, this family is among the highest in terms of residential parcels impacted.
- The station location would require street closures or grade separation.

Major Concerns

- UPRR will not allow use of their right-of-way and Alternatives 1-1, 1-2, 1-4 and 1-5 cross the UPRR Fresno Yard.
- Alternatives 1-1, 1-2, 1-4 and 1-5 traverse through the site of the historic Southern Pacific Fresno station (National Register and City of Fresno historic listing) and Section 4(f) property.

Conclusion

Alternative Family 1 – HST East of UPRR Right-of-Way, Alternatives 1-1, 1-2, 1-4 and 1-5 have two major concerns: (a) UPRR will not allow the use of their right-of-way for a high speed train system and the alternatives penetrates the UPRR Fresno Yard (b) the alternatives bisect a Section 4(f) historic structure (Southern Pacific Fresno station). Other alternatives, particularly those in Alternative Family 2 – HST West of UPRR, fulfill the intent of the Program EIR/EIS with better adherence to the Project criteria and lesser impacts. Being principally underground, Alternative 1-3 does not conflict with at-grade uses as do the other alternatives in this family. However, the below-grade design of Alternative 1-3 would require tunneling for a distance of more than seven miles through central Fresno and an underground station, a comparatively expensive solution.

Given the conflicts between Alternatives 1-1, 1-2, 1-4 and 1-5 and the UPRR Fresno Yard and the historic Southern Pacific Fresno Station, it is suggested that these alternatives be eliminated from further screening and analysis. Alternative 1-3 may be advanced as a viable, albeit expensive solution, if only for purposes of comparison.

4.2.3 Alternative Family 2 – HST West of UPRR Right-of-Way

Pros

- Low engineering complexity for Alternative 2-2 because the majority of the alternative is at-grade, considered less complex than elevated or below-grade.
- The alternative family achieves the design speed of 250 mph.
- The alternative family does not share or penetrate freight rail right-of-way.
- Among the alternative families being screened, the alternative family is among the lowest in terms of active rail sidings severed.
- The alternative family does not appear to traverse property or have features that could endanger the safe operations of high speed trains.
- Among the alternatives being screened, Alternative 2-3 is among the lowest in terms of proximity to Section 4(f) properties.
- Alternatives 2-3 and 2-5 traverse fewer incorporated communities and/or census designated places than the other alternatives within the family, thus potentially severing fewer communities and fewer impacts to community cohesiveness.
- Alternative 2-3 traverses few low income census tracts, thus potentially reducing an issue of environmental justice for the placement of the alignment.
- Among the alternatives being screened, Alternative 2-5 is among the lowest in terms of agricultural parcels impacted.
- Among the alternatives being screened, this family is among the lowest in terms of residential, commercial parcels, industrial parcels, and parcels planned for development impacted.
- The station is located within ¼-mile of the central business district as defined by the City of Fresno and within the standard transportation planning guideline for walkability (¼-mile or approximately 10 minutes).
- The station location is well connected to the roadway network and is among the lowest in terms of parcels planned for development impacted by the station footprint.
- The alternative responds to local and regional plans and policies that recommend HST serve a downtown station location.

Cons

- Medium to high engineering complexity for Alternatives 2-1, 2-3, 2-4, and 2-5 due to a majority of the alternative being elevated or below-grade, considered more complex than at-grade. Below-grade construction is highly complex, especially beneath existing bridges.
- The alignment traverses the eastern margin of Roeding Park, either on aerial structure or below-grade. A potential UPRR West to UPRR East crossover in this vicinity could mitigate this impact.
- For this family, construction of the bridge across the UPRR mainlines will be fairly complex due to the angle of skew and length of crossing.
- For Alternatives 2-1 and 2-4, crossing of the existing grade separated junctions would require an approximately 60' high HST viaduct. The spacing of the junctions may prevent the alignment reducing in elevation between junctions.
- For Alternatives 2-2, 2-4 and 2-5, several active sidings would be severed.
- Highways 99, 41, and 180 are crossed on elevated structure that could be as high as 90'-100', and this family requires use of state highway rights-of-way.
- Among the alternatives being screened, Alternatives 2-1, 2-2, 2-4 and 2-5 are among the highest in terms of proximity to Section 4(f) properties.
- Potential conflict with San Joaquin River Parkway and Conservation Trust public property, a Section 4(f) property.
- A majority of Alternatives 2-1, 2-2 and 2-4 traverse incorporated communities and/or census designated places, thus potentially severing communities and impacting community cohesiveness.
- Alternatives 2-1, 2-2, 2-4 and 2-5 traverse a number of low income census tracts, thus potentially creating environmental justice issues.

- Among the alternatives being screened, Alternatives 2-1, 2-2, 2-3 and 2-4 are among the highest in terms of agricultural parcels impacted.
- The station location is located west of the UPRR, requiring crossing of an active main line to reach the downtown and is approximately 1/3-mile from the downtown Transit Mall.
- The station location would require street closures or grade separation.

Major Concerns

- The HST alignment traverses the eastern margin of Roeding Park, either on aerial structure or below-grade.

Conclusion

While the HST alignment traverses the eastern margin of Roeding Park, either on aerial structure or below-grade, a potential west of UPRR or east of UPRR crossover in this vicinity could mitigate this impact. It is suggested that this entire alternative family be carried forward for further screening and analysis. The variants within this family should be considered optional configurations to address local concerns through the alignment.

4.2.4 Alternative Family 3 – Golden State Boulevard

Pros

- This alternative family achieves the design speed of 250 mph.
- This alternative family does not share or penetrate freight rail rights-of-way.
- Among the alternatives being screened, this family is among the lowest in terms of active rail sidings severed.
- This alternative family does not appear to traverse property or have features that could endanger the safe operations of high speed trains.
- Among the alternatives being screened, Alternative 3-2 is among the lowest in terms of proximity to Section 4(f) properties.
- Alternative 3-2 traverses fewer incorporated communities and/or census designated places than alternatives within the family, thus potentially severing fewer communities and fewer impacts to community cohesiveness.
- Alternative 3-2 traverses few low income census tracts, thus potentially reducing the risk of environmental justice issues.
- Among the alternatives being screened, this alternative family is among the lowest in terms of residential parcels impacted.
- Among the alternatives being screened, Alternative 3-2 is among the lowest in terms of commercial parcels and parcels planned for development impacted.
- The station is located within ¼-mile of the central business district as defined by the City of Fresno and within the standard transportation planning guideline for walkability (¼-mile or approximately 10 minutes).
- The station location is well connected to the roadway network.
- The alternative responds to local and regional plans and policies that recommend HST serve a downtown station location.

Cons

- Medium to high engineering complexity for Alternatives 3-1 and 3-2 due to the majority of the alternative being elevated or below-grade. Elevated and below-grade construction is considered more complex than at-grade. Below-grade construction is highly complex, especially beneath existing bridges.
- The construction of the bridge across the UPRR mainlines in the north and Golden State Boulevard in the south would be fairly difficult due to the angle of skew and length of crossings for the alternative family.

- Crossing the existing grade separated junctions for Alternative 3-1, would require an approximate 60' high HST viaduct. The spacing of the junctions may prevent the alignment reducing in elevation between junctions
- Highways 99, 41, and 180 are crossed on elevated structure that could be as high as 90'-100', and the alternative family occupies state highway rights-of-way.
- Among the alternatives being screened, Alternative 3-1 is among the highest in terms of proximity to Section 4(f) properties.
- Alternative 3-1 traverses Roeding Park, a Section 4(f) property. There are other alternatives that avoid Roeding Park.
- Potential conflict with San Joaquin River Parkway and Conservation Trust public property, a Section 4(f) property.
- Alternative 3-1 traverses incorporated communities and/or census designated places thus potentially severing communities and impacting community cohesiveness.
- Alternative 3-1 traverses a number of low income census tracts, thus potentially creating issues of environmental justice.
- Among the alternatives being screened, this alternative family is among the highest in terms of agricultural parcels impacted.
- Among the alternatives being screened, Alternative 3-1 is among the highest in terms of commercial parcels and parcels planned for development impacted.
- Among the alternatives being screened, this alternative family is among the highest in terms of industrial parcels impacted.
- The station location is located west of the UPRR, requiring crossing of an active main line to reach the downtown and is approximately 2,000' from the downtown Transit Mall.
- The station location could not serve joint HST and Amtrak operations.
- The station location is among the highest in terms of parcels planned for development impacted by the station footprint.

Major Concerns

- Alternative 3-1 traverses Roeding Park, a Section 4(f) property.
- Alternative 3-1 traverses Fresno's Chinatown District, understood to have local historical significance and to be the site of planned new development.

Conclusion

Alternative 3-1 has one major drawback in its traversal of Roeding Park, a Section 4(f) property, on elevated structure. Alternative 3-1 also traverses Fresno's Chinatown district, also on elevated structure. While Chinatown is not a designated historic landmark district, it is recognized as part of Fresno's heritage of cultural diversity. Being principally underground, Alternative 3-2 does not conflict with at-grade uses as does Alternative 3-1. However, the below-grade design of Alternative 3-2 would require tunneling for a distance of more than seven miles through central Fresno and an underground station, a comparatively expensive solution.

Since it traverses a Section 4(f) property and Fresno's Chinatown district, it is suggested that Alternative 3-1 be eliminated from further screening and analysis. Alternative 3-2 may be advanced as a viable, albeit expensive solution, if only for purposes of comparison.

4.2.5 Alternative 4 – State Route 99

Pros

- This alternative achieves the design speed of 250 mph.
- This alternative does not share or penetrate freight rail rights-of-way.
- Among the alternatives being screened, this alternative is among the lowest in terms of active rail sidings severed.

- This alternative does not appear to traverse property or have features that could endanger the safe operations of high speed trains.
- Among the alternatives being screened, this alternative is among the lowest in terms of proximity to Section 4(f) properties.
- The station is located within ¼-mile of the central business district as defined by the City of Fresno and within the standard transportation planning guideline for walkability (¼-mile or approximately 10 minutes).
- The station location is among the lowest in terms of parcels planned for development impacted by the station footprint.
- The alternative responds to local and regional plans and policies that recommend HST serve a downtown station location.

Cons

- Medium engineering complexity for this alternative because half of the alternative is at-grade and half is elevated. Elevated construction is considered more complex than at-grade.
- Crossing the existing grade separated junctions for this alternative would require an approximate 60' high HST viaduct. The spacing of the junctions may prevent the alignment from dropping to ground level between junctions.
- Highways 99, 41, and 180 and Shaw Avenue are crossed on elevated structure that could be as high as 90'-100' and the alternative family operates in the state highway rights-of-way. In addition, constructing at Highway 41 junction would be complex.
- This alternative traverses through Roeding Park, a Section 4(f) property. There are other alternatives that avoid Roeding Park.
- Potential conflict with San Joaquin River Parkway and Conservation Trust public property, a Section 4(f) property.
- This alternative traverses through incorporated communities and/or census designated places thus potentially severing communities and impacting community cohesiveness.
- This alternative traverses through a number of low income census tracts, thus potentially creating an issue of environmental justice for the placement of the alignment.
- Among the alternatives being screened, this alternative is among the highest in terms of agricultural parcels impacted.
- Among the alternatives being screened, this alternative is among the middle in terms of residential, commercial, industrial parcels impacted.
- The station location is located within or adjacent to the State Route 99 right-of-way and could create access conflicts with roadway ramps.
- The station location is located west of the UPRR, requiring the crossing of an active main line to reach the downtown and is approximately 3,000' from the downtown Transit Mall, with relatively limited access.
- The station location could not jointly serve HST and Amtrak operations.

Major Concerns

- Alternative 4 – State Route 99 traverses Roeding Park, a Section 4(f) property.

Conclusion

Alternative 4 – State Route 99 has one major drawback in that traverses Roeding Park, a Section 4(f) property. The HST station location is the farthest from the central business district, on the far side of the UPRR main line, and could jointly serve HST and Amtrak operations. It is therefore suggested that this alternative be eliminated from further screening and analysis.

4.3 OPTION SCREENING FINDINGS

Based on input from the Fresno Technical Team/TAG and public scoping/agency comments, the following options were identified and assessed in the Initial Screening:

- Option Family 1: Northern Transition
 - Option OP 1-A (UPRR-BNSF Upper Limit Crossover)
 - Option OP 1-B (UPRR-BNSF Lower Limit Crossover)
- Option 2: Western Bypass

While the options are applicable to all of the alternatives, they are analyzed for impacts strictly within the defined length of each respective option, assuming they are located at-grade throughout.

4.3.1 Option Family 1 – Northern Transition

Pros and Cons – Upper Limit Crossover (OP 1-A)

- Lower engineering complexity for the construction of OP 1-A which runs through a predominantly rural environment. OP 1-A is considered simpler and less disruptive than OP 1-B, the actual crossover section of which traverses existing residential development.
- Option does not require any shared use of freight railroad rights-of-way or Caltrans rights-of-way.
- Option does not sever any active railroad sidings.
- Option does not appear to traverse property or have features that may endanger safe HST operations.
- OP 1-A and OP 1-B respond to Fresno Technical Team/TAG requests to consider options within the UPRR-BNSF Northern Transition vicinity.

Pros and Cons – Lower Limit Crossover (OP 1-B)

- High engineering complexity for the construction of OP 1-B, which runs through a large urban setting. Construction of OP 1-B is considered more complex and more disruptive than OP 1-A, which runs through a predominantly rural environment.
- Option does not require any shared use of freight railroad rights-of-way or Caltrans rights-of-way.
- Option does not sever any active railroad sidings.
- Option does not appear to traverse property or have features that may endanger safe HST operations.
- There is a substantially higher impact to residential parcels traversed by OP 1-B than OP 1-A.
- There is a higher impact to industrial parcels traversed by OP 1-B than OP 1-A.
- There is a higher impact to commercial parcels traversed by OP 1-B than OP 1-A.
- OP 1-B appears to impact one approved/planned future development while OP 1-A does not appear to impact any approved/planned future developments.

Major Concerns

- On the basis of the different environments traversed by the options, OP 1-B (urban setting) has a greater degree of engineering complexity than OP 1-A (rural setting).
- OP 1-B directly impacts substantially more residential parcels than OP 1-A.
- Public and political support for Options OP 1-A and OP 1-B is divided. Madera County favors OP 1-B since it results in the least impact to the County's agricultural land. Council of Fresno County Governments favors OP 1-A since it results in the least impact to residential property in Fresno.

Conclusion

The analysis showed that regardless of the differences between the rural and urban environments, Options OP 1-A and OP 1-B both had similar overall impacts to agricultural land in terms of the number of miles of agricultural land and the number of agricultural parcels traversed by the alignments. In addition, OP 1-B directly impacts a substantially greater number of residential parcels than does OP 1-A. It is suggested that both options be considered in the Preliminary Alternatives Analysis, pending determination by the Authority and the counties of Fresno and Madera as to the ultimate location of the crossover.

4.3.2 Option 2 – Western Bypass

Pros

- OP 2 has a low engineering complexity because it is assumed that OP 2 runs a-grade from end-to-end.
- OP 2 does not require any shared use of freight railroad rights-of-way or Caltrans rights-of-way.
- OP 2 does not sever any active railroad sidings.
- OP 2 does not appear to traverse property or have features that may endanger safe HST operations.
- OP 2 responds to public scoping/agency comments from the Council of Fresno County Governments and City of Fresno. Both agencies requested that a bypass loop/corridor west of metropolitan Fresno be considered.
- OP 2 enables the cross-sectional width of the HST alignment through central Fresno to be reduced to two tracks.
- OP 2 enables the HST alignment through central Fresno to be more flexible, with an anticipated operating speed of no more than 110 mph for trains stopping in Fresno.
- Operation of 250-mph through trains via a bypass will reduce noise, vibration and visual impacts in central Fresno.
- A western bypass may be constructed more quickly than HST station tracks through central Fresno, allowing the initial operating segment to be placed in operation for testing well in advance of revenue service.
- The western bypass option complements local initiative to re-align freight railroads that currently traverse central Fresno via two separate alignments, and increases the likelihood of a joint HST/Amtrak station.

Cons

- OP 2 crosses two highways (Highways 41 and 99), which would require grade separation and coordination between the Authority and Caltrans.
- The majority of OP 2 runs through agricultural land and directly impacts a significant number of agricultural parcels.
- The western bypass would require acquisition of right-of-way in addition to that through central Fresno.
- The Authority has made commitments to constituencies that opposed the alignment of HST tracks outside existing transportation corridors.

Major Concerns

- The option runs principally through agricultural land and would therefore result in a large number of agricultural parcel takings.
- Potential legal challenge to the re-introduction of the bypass concept.
- The United States Environmental Protection Agency (US EPA) recommended in scoping comments that the study of bypass alternatives "provide a comparison chart of environmental impacts associated with each bypass proposed" and "commends the FRA and CHSRA commitment to analyzing Central Valley routes, with and without bypasses in the Draft EIS, to demonstrate to decision makers the full impact of bypasses and to provide flexibility in determining the best mix of bypass and mainline routes."

Conclusion

While OP 2 would result in impacts to agricultural land, the bypass would enable express trains to operate at full speed outside central Fresno, with less impact to their neighboring land uses. A smaller HST cross-section, designed for operation up to 110 mph, would enable greater flexibility and lesser impact through central Fresno than a full four-track cross-section. It is suggested that OP 2 be evaluated in the Preliminary Alternatives Analysis, in response to local aspirations and potential benefit to HST operations.

4.4 SUMMARY

On the basis of the Initial Screening, it is suggested that the following alternatives be eliminated from further consideration:

- Program EIR/EIS Preferred Alignment
- Alternative Family 1 – HST East of UPRR Right-of-Way – Alternatives 1-1, 1-2, 1-4 and 1-5
- Alternative Family 3 – Golden State Boulevard – Alternative 3-1 only
- Alternative 4 – State Route 99

It is suggested that the following alternatives be refined and evaluated in the Preliminary Alternatives Analysis:

- Alternative 1-3 – HST East of UPRR Right-of-Way – Below-Grade
- Alternative Family 2 – HST West of UPRR Right-of-Way
- Alternative 3-2 – Golden State Boulevard – Below-Grade

It is further suggested that all of the options, which are applicable to all of the alternatives be refined and evaluated in the Preliminary Alternatives Analysis:

- Option OP 1-A (UPRR-BNSF Upper Limit Crossover)
- Option OP 1-B (UPRR-BNSF Lower Limit Crossover)
- Option 2: Western Bypass

Table 5 summarizes the outcome of the analysis by alternative and option.

**TABLE 5 – Merced to Bakersfield (Fresno Study)
Summary of Initial Screening**

Alternative/Option Number	Description	Origin	Scope	Predominant Profile	Station Location	Conclusion
Program EIR/EIS Preferred Alignment	Merced - Fresno	Program EIR/EIS	Full Alignment Alternative	At-Grade	Downtown Fresno	The Preferred Alignment has two major concerns: (a) UPRR will not allow the use of their right-of-way for a high speed train system and (b) The alignment also traverses through Roeding Park, a Section 4(f) property. Other alternatives fulfill the intent of the Program EIR/EIS Preferred Alignment with better adherence to the Project criteria and lesser impacts. It is suggested that the Program EIR/EIS Preferred Alignment be eliminated from further screening and analysis.
	Fresno - Bakersfield			At-Grade		
Alternative Family 1 HST East of UPRR	Alternative 1-1 Elevated Through Central Fresno	Technical Team / TAG	Full Alignment Alternative	Elevated Through Central Fresno	Downtown Fresno	Given the conflicts between this alternative and the UPRR Fresno Yard and the historic Southern Pacific Fresno Station, it is suggested that Alternative 1-1 be eliminated from further screening and analysis.
	Alternative 1-2 At-Grade Through Central Fresno	Technical Team / TAG	Full Alignment Alternative	At-Grade Through Central Fresno	Downtown Fresno	Given the conflicts between this alternative and the UPRR Fresno Yard and the historic Southern Pacific Fresno Station, it is suggested that Alternative 1-2 be eliminated from further screening and analysis.
	Alternative 1-3 Below-Grade Through Central Fresno	Technical Team / TAG	Full Alignment Alternative	Below-Grade Through Central Fresno	Downtown Fresno	Being principally underground, Alternative 1-3 does not conflict with at-grade uses as do the other alternatives in this family. However, the below-grade design of Alternative 1-3 would require tunneling for a distance of more than seven miles through central Fresno and an underground station, a comparatively expensive solution. It is suggested that Alternative 1-3 be advanced as a viable, albeit expensive solution, if only for purposes of comparison.
	Alternative 1-4 Through Tracks Elevated; Station Tracks at-Grade	Technical Team / TAG	Full Alignment Alternative	Through Tracks Elevated; Station Tracks at-Grade	Downtown Fresno	Given the conflicts between this alternative and the UPRR Fresno Yard and the historic Southern Pacific Fresno Station, it is suggested that Alternative 1-4 be eliminated from further screening and analysis.
	Alternative 1-5 Through Tracks Below-Grade; Station Tracks at-Grade	Technical Team / TAG	Full Alignment Alternative	Through Tracks Below-Grade; Station Tracks at-Grade	Downtown Fresno	Given the conflicts between this alternative and the UPRR Fresno Yard and the historic Southern Pacific Fresno Station, it is suggested that Alternative 1-5 be eliminated from further screening and analysis.

TABLE 5 – Merced to Bakersfield (Fresno Study)
Summary of Initial Screening

Alternative/Option Number	Description	Origin	Scope	Predominant Profile	Station Location	Conclusion
Alternative Family 2 HST West of UPRR	Alternative 2-1 Elevated Through Central Fresno	Technical Team / TAG	Full Alignment Alternative	Elevated Through Central Fresno	Downtown Fresno	No major concerns at this level of Initial Screening. It is suggested that this entire alternative family be carried forward for further screening and analysis. The variants within this family should be considered optional configurations to address local concerns through the alignment.
	Alternative 2-2 At-Grade Through Central Fresno	Technical Team / TAG	Full Alignment Alternative	At-Grade Through Central Fresno	Downtown Fresno	No major concerns at this level of Initial Screening. It is suggested that this entire alternative family be carried forward for further screening and analysis. The variants within this family should be considered optional configurations to address local concerns through the alignment.
	Alternative 2-3 Below-Grade Through Central Fresno	Technical Team / TAG	Full Alignment Alternative	Below-Grade Through Central Fresno	Downtown Fresno	No major concerns at this level of Initial Screening. It is suggested that this entire alternative family be carried forward for further screening and analysis. The variants within this family should be considered optional configurations to address local concerns through the alignment.
	Alternative 2-4 Through Tracks Elevated; Station Tracks at-Grade	Technical Team / TAG	Full Alignment Alternative	Through Tracks Elevated; Station Tracks at-Grade	Downtown Fresno	No major concerns at this level of Initial Screening. It is suggested that this entire alternative family be carried forward for further screening and analysis. The variants within this family should be considered optional configurations to address local concerns through the alignment.
	Alternative 2-5 Through Tracks Below-Grade; Station Tracks at-Grade	Technical Team / TAG	Full Alignment Alternative	Through Tracks Below-Grade; Station Tracks at-Grade	Downtown Fresno	No major concerns at this level of Initial Screening. It is suggested that this entire alternative family be carried forward for further screening and analysis. The variants within this family should be considered optional configurations to address local concerns through the alignment.
Alternative Family 3 Golden State Boulevard	Alternative 3-1 Elevated Through Central Fresno	Technical Team / TAG	Full Alignment Alternative	Elevated Through Central Fresno	Downtown Fresno	Alternative 3-1 traverses Roeding Park, a Section 4(f) property and Fresno's Chinatown district on elevated structure. While Chinatown is not a designated historic landmark district, it is recognized as part of Fresno's heritage of cultural diversity. It is suggested that Alternative 3-1 be eliminated from further screening and analysis since it traverses a Section 4(f) property and Fresno's Chinatown district.
	Alternative 3-2 Below-Grade Through Central Fresno	Technical Team / TAG	Full Alignment Alternative	Below-Grade Through Central Fresno	Downtown Fresno	Alternative 3-2 is principally underground and does not conflict with at-grade uses as does Alternative 3-1. However, the below-grade design of Alternative 3.2 would require tunneling for a distance of more than seven miles through central Fresno and an underground station, a comparatively expensive solution. It is suggested that Alternative 3-2 be advanced as a viable, albeit expensive solution, if only for purposes of comparison.
Alternative 4 State Route 99	Alternative 4 Elevated Through Central Fresno	Technical Team / TAG	Full Alignment Alternative	Elevated Through Central Fresno	Downtown Fresno	Alternative 4 traverses Roeding Park, a Section 4(f) property. The HST station location is the farthest from the central business district, on the far side of the UPRR main line, and could jointly serve HST and Amtrak operations. It is suggested that Alternative 4 be eliminated from further screening and analysis.

**TABLE 5 – Merced to Bakersfield (Fresno Study)
Summary of Initial Screening**

Alternative/Option Number	Description	Origin	Scope	Predominant Profile	Station Location	Conclusion
Option Family 1 Northern Transition	Option OP 1-A UPRR-BNSF Upper Limit Crossover (Within Madera County)	Technical Team / TAG	Local Option; Applicable to all Full Alternatives	At-Grade	N/A	Options 1-A and 1-B both had similar overall impacts to agricultural land in terms of the number of miles of agricultural land and the number of agricultural parcels traversed by the alignments. It is suggested that OP 1-A be considered in the Preliminary Alternatives Analysis, pending determination by the Authority and the Counties of Fresno and Madera as to the ultimate location of the crossover.
	Option OP 1-B UPRR-BNSF Lower Limit Crossover (Within Fresno)	Technical Team / TAG	Local Option; Applicable to all Full Alternatives	At-Grade	N/A	Options 1-A and 1-B both had similar overall impacts to agricultural land in terms of the number of miles of agricultural land and the number of agricultural parcels traversed by the alignments. OP 1-B directly impacts a substantially greater number of residential parcels than does Option 1-A. It is suggested that OP 1-B be considered in the Preliminary Alternatives Analysis, pending determination by the Authority and the Counties of Fresno and Madera as to the ultimate location of the crossover.
Option 2 Western Bypass	Option OP 2 Western Bypass (for trains not stopping in Fresno)	Public Scoping / Agency Comments	Option; Applicable to all Full Alternatives	At-Grade	N/A	While OP 2 would result in impacts to agricultural land, the bypass would enable express trains to operate at full speed outside central Fresno, with less impact to their neighboring land uses. A smaller HST cross-section, designed for operation up to 110 mph, would enable greater flexibility and lesser impact through central Fresno than a full four-track cross-section. It is suggested that OP 2 be evaluated in the Preliminary Alternatives Analysis, in response to local aspirations and potential benefit to HST operations.

Appendix A: INITIAL SCREENING ANALYSIS

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Appendix A: Draft Initial Screening Analysis (Fresno Study) - Alternatives

					Program EIR/EIS Preferred Alignment		Family 1 - East of UPRR					Family 2 - West of UPRR					Family 3 - Golden State Blvd.			Family 4 - State Route 99			
Objective	No.	Criteria	Metric	Scoring Guide	All At-grade	Program EIR/EIS Preferred Alignment Comments	1-1	1-2	1-3	1-4	1-5	Family 1 Comments	2-1	2-2	2-3	2-4	2-5	Family 2 Comments	3-1	3-2	Family 3 Comments	4-1	Family 4 Comments
							Elevated	All At-grade	Below Grade	Through-Elevated; Station-At-Grade	Through- Below Grade; Station - At-Grade		Elevated	All At-grade	Below Grade	Through-Elevated; Station-At-Grade	Through- Below Grade; Station-At-Grade		Elevated	Below Grade		Elevated	
Severe Constraints	1a	Engineering complexity	Number of miles of alignment elevated, at grade, and below grade	- High impact - Medium impact - Low impact	23 miles at grade, 5 miles elevated (LOW)	23 miles are at-grade and 5 miles is elevated; Limited vertical variation, low-end of the spectrum for engineering complexity	16 miles at grade, 12 miles elevated (MED)	23 miles at grade, 5 miles elevated (LOW)	15.5 miles at grade, 4 miles elevated, 8.5 miles depth (HIGH)	20 miles at grade, 12 miles elevated (MED)	19.5 miles at grade, 4 miles elevated, 8.5 miles depth (HIGH)	Alternatives 1-3 and 1-5 are the most complex; majority of these alignments are below-grade	15 miles at grade, 13 miles elevated (MED)	23 miles at grade, 5 miles elevated (LOW)	14.5 miles at grade, 5 miles elevated, 8.5 miles depth (HIGH)	19 miles at grade, 13 miles elevated (MED)	18.5 miles at grade, 5 miles elevated, 8.5 miles depth (HIGH)	Alternatives 2-3 and 2-5 are the most complex; majority of these alignments are below-grade	19 miles at grade, 9 miles elevated (MED)	16 miles at grade, 5.5 miles elevated, 6.5 miles depth (HIGH)	Alternative 3-2 is the most complex; majority of this alignment is below-grade	16 miles at grade, 12 miles elevated (MED)	Alternative has a medium level of complexity, with a combination of at-grade and elevated configurations
	1b		Number of major waterways (river and canals) crossed by the alignment	- High impact - Medium impact - Low impact	2 canals (Herndon and Dry Creek) and 1 crossing of San Joaquin River MED (not a differentiator since all alternatives cross the same waterways)																		
	2	Limiting Speed	Lowest operating speed at any point on the alignment	< 219 mph 220 – 249 mph > 250 mph	250 mph (Same speed for all alternatives; Not a differentiator)																		
	3	Railroad right-of-way access	Number of miles of alignment that require shared use of freight railroad rights-of-way	- High impact - Medium impact - Low impact	3 miles (HIGH)	Through UPRR Yard area, UPRR has sent a letter (April 8, 2009) to the Authority stating "we will not voluntarily make these or any part of the Fresno subdivision available for the high-speed rail alignment." Therefore, since UPRR will not allow the use of their right-of-way this alternative will be eliminated.	2.5 miles through UPRR rail yard (HIGH)					Crossing UPRR near Calwa Yard and through UPRR Yard area. UPRR has sent a letter (April 8, 2009) to the Authority stating "we will not voluntarily make these or any part of the Fresno subdivision available for the high-speed rail alignment." Therefore, since UPRR will not allow the use of their right-of-way this alternative will be eliminated.	0.25 miles (MED)					Northern crossing of freight railroad ROW; length of 0.25 falls within the middle of the spectrum	0.25 (MED)		Northern crossing of freight railroad ROW; length of 0.25 falls within the middle of the spectrum	200 ft (LOW)	Northern crossing of freight railroad ROW; length of 200 ft falls within the low end of the spectrum
	4	Public right-of-way access	Number of miles of alignment that require shared use of Caltrans right-of-way	- High impact - Medium impact - Low impact	3 crossings of Caltrans ROW (MED)	Hwys 99, 41, and 180 are crossed over on aerial structure that could be as high as 90'-100'. Does not run within the Caltrans ROW	3 crossings of Caltrans ROW (MED)					Hwys 99, 41, and 180 are crossed over on aerial structure that could be as high as 90'-100'. Does not run within the Caltrans ROW	3 crossings of Caltrans ROW + 1.5 miles in ROW (HIGH)					Hwys 99, 41, and 180 are crossed over on aerial structure that could be as high as 90'-100', in addition to operating 1.5 miles in the Caltrans ROW	3 crossings of Caltrans ROW + 1.5 miles in ROW (HIGH)		Hwys 99, 41, and 180 are crossed over on aerial structure that could be as high as 90'-100', in addition to operating 1.5 miles in the Caltrans ROW	4 crossings of Caltrans ROW + 3.5 miles in ROW (HIGH)	Hwys 99, 41, 180, and Shaw Ave intersection are crossed over on aerial structure that could be as high as 90'-100', in addition to operating 3.5 miles in the Caltrans ROW
	5	Railroad operations	Number of active railroad sidings that will be severed by the alignment	- High impact - Medium impact - Low impact	4 (MED)	Within the medium range of spectrum for the number of active sidings impacted Includes SJVRR and south access to UPRR Fresno yard	1 (LOW)	9 (HIGH)	2 (MED)	9 (HIGH)	9 (HIGH)	Alternatives 1-2, 1-4 and 1-5 are within the high end of the spectrum for number of active sidings impacted	0 (LOW)	3 (MED)	1 (LOW)	3 (MED)	3 (MED)	Alternatives 2-2, 2-4 and 2-5 are within the medium end of the spectrum for number of active sidings impacted	0 (LOW)	0 (LOW)	Alternatives will not sever any active railroad sidings	0 (LOW)	Alternative will not sever any active railroad sidings
Conflicts With Existing Conditions	6	Operational safety	Does the alternative traverse property or features that could endanger safe HST operation?	- Yes - Unable to determine - No	No (At this time, this alignment does not appear to traverse property or have features that may endanger safe HST operations; not a differentiator.)																		
	7a	Land use impacts	Is the station located in the cities' designated central business district?	- Yes - Unable to determine - No	No	Based on City of Fresno definition of CBD. Station is not in CBD; However the potential station location is adjacent to and within ¼-mile of the CBD	No	No	No	No	No	Based on City of Fresno definition of CBD. Station is not in CBD; However the potential station location is adjacent to and within ¼-mile of the CBD	No	No	No	No	No	Based on City of Fresno definition of CBD. Station is not in CBD; However the potential station location is adjacent to and within ¼-mile of the CBD	No	No	Based on City of Fresno definition of CBD. Station is not in CBD; However the potential station location is within ¼-mile of the CBD	No	Based on City of Fresno definition of CBD. Station is not in CBD; However the potential station location is within ¼-mile of the CBD
	7b		Number of miles of the alignment that traverse agricultural (includes a definition of agricultural land) land	- High impact - Medium impact - Low impact	12 (LOW)	Traverses 12 miles of agricultural land; Within the low end of the spectrum for the miles of agricultural land traversed	11 (LOW)	11 (LOW)	11 (LOW)	11 (LOW)	11 (LOW)	All alternatives traverse 11 miles of agricultural land; Within the low end of spectrum for the miles of agricultural land traversed	11 (LOW)	11 (LOW)	11 (LOW)	11 (LOW)	11 (LOW)	All alternatives traverse 11 miles of agricultural land; Within the low end of spectrum for the miles of agricultural land traversed	11 (LOW)	11 (LOW)	All alternatives traverse 11 miles of agricultural land; Within the low end of spectrum for the miles of agricultural land traversed	11 (LOW)	Alternative traverses 11 miles of agricultural land; Within the low end of spectrum for the miles of agricultural land traversed
	8	Section 4(f) impacts	Number of 4(f) resources located within ¼ mile of the alignment: - Fresno & Bakersfield (urban) – 4(f) is (a) parks and recreation areas, (b) wildlife refuges, and (c) cultural resources, including historic sites. - Bakersfield-Fresno (rural) - 4(f) is (a) parks and recreation areas, (b) wildlife refuges, (c) cultural resources, including historic sites, and (d) wildlife management areas and wild and scenic rivers.	- High impact - Medium impact - Low impact	50 (HIGH)	The Preferred Alignment traverses through Roeding Regional Park a 4(f) property. There are other feasible and prudent alternatives to this family and therefore this alternative will be eliminated.	68 (HIGH)	68 (HIGH)	3 (LOW)	68 (HIGH)	65 (HIGH)	Alternatives 1-2, 1-2, 1-4 and 1-5 bisects the historic Southern Pacific Depot (National Register and City of Fresno historic listing), therefore since this alignment cuts through the building, these alternative will be eliminated. Alternative 1-3 goes below the Southern Pacific Depot.	62 (HIGH)	62 (HIGH)	2 (LOW)	62 (HIGH)	60 (HIGH)	Alternatives 2-1, 2-2, 2-4 and 2-5 have among the highest numbers of Section 4(f) properties in proximity to the alternatives.	49 (HIGH)	3 (LOW)	Alternative 3-1 traverses through Roeding Regional Park a 4(f) property. There are other feasible and prudent alternatives to this family and therefore this alternative will be eliminated. Alternative 3-2 does not traverse through Roeding Park.	22 (LOW)	This family traverses through Roeding Regional Park a 4(f) property. There are other feasible and prudent alternatives to this family and therefore this family will be eliminated.
	9a	Community Impacts	Number of miles of alignment that traverse incorporated communities and census-designated places	- High impact - Medium impact - Low impact	17 (HIGH)	Within the high end of the spectrum for potential to impact community cohesiveness	17 (HIGH)	17 (HIGH)	9 (LOW)	17 (HIGH)	8 (LOW)	Alternatives 1-1, 1-2, and 1-4 are within the high end of spectrum for potential to impact community cohesiveness	17 (HIGH)	17 (HIGH)	9 (LOW)	17 (HIGH)	8 (LOW)	Alternatives 2-1, 2-2, and 2-4 are within the high end of spectrum for potential to impact community cohesiveness	17 (HIGH)	10 (LOW)	Alternative 3-1 is within the high end of spectrum for potential to impact community cohesiveness	17 (HIGH)	This alternative is within the high end of spectrum for potential to impact community cohesiveness
	9b		Number of census tracts with population at poverty status, 10% greater than countywide, within a quarter mile	- High impact - Medium impact - Low impact	9 (HIGH)	Within the high end of the spectrum for impacts to low income populations	9 (HIGH)	9 (HIGH)	2 (LOW)	9 (HIGH)	9 (HIGH)	All alternatives except Alternative 1-3 are within the high end of the spectrum for impacts to low income populations	9 (HIGH)	9 (HIGH)	2 (LOW)	9 (HIGH)	9 (HIGH)	All alternatives except Alternative 2-3 are within the high end of the spectrum for impacts to low income populations	9 (HIGH)	2 (LOW)	Alternative 3-1 is within the high end of the spectrum for impacts to low income populations	7 (MED)	This alternative is within the medium range of the spectrum for impacts to low income populations
	10a	Property impacts	Number of agricultural parcels traversed by the alignment	- High impact - Medium impact - Low impact	63 (HIGH)	Within the high end of the spectrum for agricultural parcels	65 (HIGH)	65 (HIGH)	65 (HIGH)	65 (HIGH)	0 (LOW)	All alternatives except Alternative 1-5 are within the high end of the spectrum for number of traversed agricultural parcels	65 (HIGH)	65 (HIGH)	65 (HIGH)	65 (HIGH)	0 (LOW)	All alternatives except Alternative 2-5 are within the high end of the spectrum for number of traversed agricultural parcels	65 (HIGH)	65 (HIGH)	All alternatives are within the high end of the spectrum for number of traversed agricultural parcels	69 (HIGH)	This alternative is within the high end of the spectrum for number of traversed agricultural parcels
10b	Number of residential parcels traversed by the alignment?		- High impact - Medium impact - Low impact	28 (LOW)	Within the low end of the spectrum for residential parcels	97 (HIGH)	97 (HIGH)	47 (MED)	97 (HIGH)	52 (MED)	Alternatives 1-1, 1-2, and 1-4 are within the high end of the spectrum for number of traversed residential parcels	44 (LOW)	44 (LOW)	23 (LOW)	44 (LOW)	21 (LOW)	All alternatives are within the low end of the spectrum for number of traversed residential parcels	31 (LOW)	23 (LOW)	All alternatives are within the low end of the spectrum for number of traversed residential parcels	53 (MED)	This alternative is within the medium range of the spectrum for number of traversed residential parcels	
10c	Number of commercial parcels traversed by the alignment		- High impact - Medium impact - Low impact	17 (MED)	Within the medium range of the spectrum for commercial parcels	5 (LOW)	5 (LOW)	2 (LOW)	5 (LOW)	3 (LOW)	All alternatives are within the low end of the spectrum for number of traversed commercial parcels	0 (LOW)	0 (LOW)	0 (LOW)	0 (LOW)	0 (LOW)	All alternatives are within the low end of the spectrum for number of traversed commercial parcels	49 (HIGH)	12 (LOW)	Alternative 3-1 is within the high end of the spectrum for the number of traversed commercial parcels	23 (MED)	This alternative is within the medium range of the spectrum for number of traversed commercial parcels	
10d	Number of industrial parcels traversed by the alignment		- High impact - Medium impact - Low impact	77 (MED)	Within the medium range of the spectrum for industrial parcels	77 (MED)	77 (MED)	39 (LOW)	77 (MED)	38 (LOW)	Alternatives 1-1, 1-2, and 1-4 are within the medium range of the spectrum for number of traversed industrial parcels	74 (MED)	74 (MED)	25 (LOW)	74 (MED)	50 (LOW)	Alternatives 2-1, 2-2, and 2-4 are within the medium range of the spectrum for number of traversed industrial parcels	106 (HIGH)	69 (MED)	Alternative 3-1 is within the high end of the spectrum for the number of traversed industrial parcels	101 (HIGH)	This alternative is within the high end of the spectrum for the number of traversed industrial parcels	

Appendix A: Draft Initial Screening Analysis (Fresno Study) - Alternatives

					Program EIR/EIS Preferred Alignment		Family 1 - East of UPRR					Family 2 - West of UPRR					Family 3 - Golden State Blvd.			Family 4 - State Route 99			
Objective	No.	Criteria	Metric	Scoring Guide	All At-grade	Program EIR/EIS Preferred Alignment Comments	1-1	1-2	1-3	1-4	1-5	Family 1 Comments	2-1	2-2	2-3	2-4	2-5	Family 2 Comments	3-1	3-2	Family 3 Comments	4-1	Family 4 Comments
							Elevated	All At-grade	Below Grade	Through-Elevated; Station-At-Grade	Through - Below Grade; Station - At-Grade		Elevated	All At-grade	Below Grade	Through-Elevated; Station-At-Grade	Through- Below Grade; Station-At-Grade		Elevated	Below Grade		Elevated	
Conflicts With Existing Conditions (continued)	11	Connectivity	How well does the station site mesh with the existing road and traffic network?	- Poorly - Average - Well	Average	Station well connected to roadway network, but the grade alignment will require street closures or grade separations.	Well	Average	Well	Average	Average	Station well connected to roadway network, but the grade alignments will require street closures or grade separations	Well	Average	Well	Average	Average	Station well connected to roadway network, but the grade alignments will require street closures or grade separations	Well	Well	Station well connected to roadway network,	Poorly	Station located within or adjacent to SR 99 ROW could create access conflicts with SR 99 ramps
	12		How well does the station site mesh with the existing transportation network?	- Poorly - Average - Well	Average	Station located west of UPRR alignment, requires crossing of heavy rail tracks to reach downtown, approx. 1800' from Transit Mall.	Well	Well	Well	Well	Well	Station located east of UPRR alignment, does not require crossing of heavy rail tracks to reach downtown, approx. 1300' from Transit Mall.	Average	Average	Average	Average	Average	Station located west of UPRR alignment, requires crossing of heavy rail tracks to reach downtown, approx. 1600' from Transit Mall.	Average	Average	Station located west of UPRR alignment, requires crossing of heavy rail tracks to reach downtown, approx. 2000' from Transit Mall.	Poorly	Station located west of UPRR alignment, requires crossing of heavy rail tracks to reach downtown, approx. 3000' from Transit Mall, relatively limited existing transit service near station site.
Approved Future Development in the Study Area	13a	Land use impacts	Number of parcels planned for development traversed by the alignment	- High impact - Medium impact - Low impact	8 (LOW)	Within the low end of the spectrum for planned development	8 (LOW)	8 (LOW)	1 (LOW)	8 (LOW)	7 (LOW)	All alternatives are within the low end of the spectrum for planned development	2 (LOW)	2 (LOW)	1 (LOW)	2 (LOW)	1 (LOW)	All alternatives are within the low end of the spectrum for planned development	44 (HIGH)	5 (LOW)	Alternative 3-1 is within the high end of the spectrum for planned development	5 (LOW)	This alternative is within the low end of the spectrum for planned development
	13b		Number of parcels planned for development impacted by the station footprint	- High impact - Medium impact - Low impact	0 (LOW)	Within the low end of the spectrum for planned development	0 (LOW)	0 (LOW)	0 (LOW)	0 (LOW)	0 (LOW)	All alternatives are within the low end of the spectrum for planned development	0 (LOW)	0 (LOW)	0 (LOW)	0 (LOW)	0 (LOW)	All alternatives are within the low end of the spectrum for planned development	33 (HIGH)	33 (HIGH)	All alternatives are within the high end of the spectrum for planned development	0 (LOW)	This alternative is within the low end of the spectrum for planned development
	14	Public and political support	Is the alternative supported by regional/local plans and policies?	- Yes - Unable to determine - No	Yes	Alignment selected as Program EIR/EIS Preferred Alignment, responds to plans/policies to serve a downtown station location. Support established by the City of Fresno letter of April 7, 2009 and Fresno COG letter of April 9, 2009	Yes	Yes	Yes	Yes	Yes	All alternatives respond to plans/policies to serve a downtown station location. Support established by the City of Fresno letter of April 7, 2009 and Fresno COG letter of April 9, 2009	Yes	Yes	Yes	Yes	Yes	All alternatives respond to plans/policies to serve a downtown station location. Support established by the City of Fresno letter of April 7, 2009 and Fresno COG letter of April 9, 2009	Yes	Yes	All alternatives respond to plans/policies to serve a downtown station location. Support established by the City of Fresno letter of April 7, 2009 and Fresno COG letter of April 9, 2009	Yes	All alternatives respond to plans/policies to serve a downtown station location. Support established by the City of Fresno letter of April 7, 2009 and Fresno COG letter of April 9, 2009

Appendix A: Draft Initial Screening Analysis (Fresno Study) - Options

					Options (All At-Grade)				
Objective	No.	Criteria	Metric	Scoring Guide	OP 1-A	OP 1-B	Crossover Comments	OP 2	Western Bypass Comments
					UPRR-BNSF Upper Limit Crossover	UPRR-BNSF Lower Limit Crossover		Western Bypass	
Severe Constraints	1a	Engineering complexity	Number of miles of alignment elevated, at grade, and below grade	- High impact - Medium impact - Low impact	No net change to parent alternative		Construction of OP 1-A (rural) is simpler and less disruptive than OP 1-B (urban)	29.5 miles at grade	This option has a low level of complexity, assuming it runs at-grade
	1b		Number of major waterways (river and canals) crossed by the alignment	- High impact - Medium impact - Low impact	No net change to parent alternative				
	2	Limiting Speed	Lowest operating speed at any point on the alignment	- High impact - Medium impact - Low impact < 219 mph 220 – 249 mph > 250 mph	No net change to parent alternative				
	3	Railroad right-of-way access	Number of miles of alignment that require shared use of freight railroad rights-of-way	- High impact - Medium impact - Low impact	0	0	Options do not require any shared use of freight railroad ROW	0	Option does not require any shared use of freight railroad ROW
	4	Public right-of-way access	Number of miles of alignment that require shared use of Caltrans rights-of-way	- High impact - Medium impact - Low impact	0	0	Options do not require shared use of Caltrans ROW	2 crossings of Caltrans ROW	Hwys 41, 99 are crossed over on aerial structure; Does not run within the Caltrans ROW
	5	Railroad operations	Number of active railroad sidings that will be severed by the alignment	- High impact - Medium impact - Low impact	0 (see comments)	0	OP 1-A has a positive impact on Options 1-2 to 1-5 by avoiding 2 sidings	1 crossing of SSVRR	Option will not sever any active railroad sidings
	6	Operational safety	Does the alternative traverse property or features that could endanger safe HST operation?	- Yes - Unable to determine - No	No net change to parent alternative				
Conflicts With Existing Conditions	7a	Land use impacts	Is the station located in the cities' designated central business district?	- Yes - Unable to determine - No	Not applicable				
	7b		Number of miles of the alignment that traverse agricultural (includes all definition of agricultural land) land	- High impact - Medium impact - Low impact	7	6	Options traverse 6 to 7 miles of agricultural land; Not a differentiator between Options 1-A and 1-B	27	This option traverses 27 miles of agricultural land.
	8	Section 4(f) impacts	Number of 4(f) resources located within 1/4 mile of the alignment: - Fresno & Bakersfield (urban) – 4(f) is (a) parks and recreation areas, (b) wildlife refuges, and (c) cultural resources, including historic sites. - Bakersfield-Fresno (rural) – 4(f) is (a) parks and recreation areas, (b) wildlife refuges, (c) cultural resources, including historic sites, and (d) wildlife management areas.	- High impact - Medium impact - Low impact	2	1	Each option has among the lowest number of Section 4(f) properties in proximity to the option.	3	This option is among the lowest number of Section 4(f) properties in proximity to the option.
	9a	Community Impacts	Number of miles of alignment that traverse incorporated communities and census-designated places	- High impact - Medium impact - Low impact	7	6	Each option traverses 6 to 7 incorporated communities/ census-designated places; Not a differentiator between Options 1-A and 1-B	1	This option traverses 1 incorporated community/ census-designated place
	9b		Number of census tracts with population at poverty status, 10% greater than countywide, within a quarter mile	- High impact - Medium impact - Low impact	2	2	Each option impacts 2 low-income populated census tracts; Not a differentiator between Options 1-A and 1-B	1	This option impacts 1 low-income census tract
	10a		Number of agricultural parcels traversed by the alignment	- High impact - Medium impact - Low impact	30	28	Options traverse 28 to 30 agricultural parcels; Not a differentiator between Options 1A and 1B	177	This option traverses 177 agricultural parcels
	10b	Property impacts	Number of residential parcels traversed by the alignment?	- High impact - Medium impact - Low impact	24	224	Option 1-B has a significant impact to residential parcels (224 parcels) compared to Option 1A (24 parcels)	1	This option traverses 1 residential parcel
	10c		Number of commercial parcels traversed by the alignment	- High impact - Medium impact - Low impact	0	5	Option 1-B impacts 5 commercial parcels compared to Option 1-A (0 parcels)	0	This option does not traverse any commercial parcels
	10d		Number of industrial parcels traversed by the alignment	- High impact - Medium impact - Low impact	1	24	Option 1-B impacts 24 industrial parcels compared to Option 1-A (1 parcel)	3	This option traverses 3 industrial parcels
	11		How well does the station site mesh with the existing road and traffic network?	- Poorly - Average - Well	Not applicable				
	12	Connectivity	How well does the station site mesh with the existing transportation network?	- Poorly - Average - Well	Not applicable				
Approved Future Development in the Study Area	13a	Land use impacts	Number of parcels planned for development traversed by the alignment	- High impact - Medium impact - Low impact	1	0	Options impact 0 to 1 parcels planned for development; Not a differentiator between Options 1-A and 1-B	0	This option does not impact any parcels planned for development
	13b		Number of parcels planned for development impacted by the station footprint	- High impact - Medium impact - Low impact	Not applicable				
	14	Public and political support	Is the alternative supported by regional/local plans and policies?	- Yes - Unable to determine - No	Yes	Yes	Options respond to comments to consider impacts in crossover vicinity for Madera and Fresno counties. Option 1-A is supported by the City of Fresno letter of April 7, 2009 and Fresno COG letter of April 9, 2009 Option 1-B is supported by RMA Madera County letter of April 8, 2009	Yes	This alternative responds to the scoping comment to consider a bypass option to the west of downtown. Support established by the City of Fresno letter of April 7, 2009 and Fresno COG letter of April 9, 2009

APPENDIX E-2

Final Initial Screening Analysis – Rural Area

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California High-Speed Train Project



Merced to Bakersfield EIR/EIS

ALTERNATIVES ANALYSIS REPORT FINAL

**INITIAL SCREENING MEMORANDUM -
FRESNO TO BAKERSFIELD RURAL AREA**

Prepared by:

URS/HMM/Arup Joint Venture





August 20, 2009

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1.0 INTRODUCTION

This memorandum documents the Initial Screening of alternatives for alignment of the California High-Speed Train (CAHST) Project in the rural area between Fresno and Bakersfield, California. The screening process compares the extent to which a range of alternatives meets the purpose for the High-Speed Train (HST) Project, on the basis of engineering, operational and environmental criteria defined by the California High-Speed Rail Authority (Authority). The findings of this screening will be used to identify alternatives to carry forward for Preliminary Alternatives Analysis. The methodology, data sources and metrics used in the Initial Screening are consistent with the direction provided in the *CAHST Project Alternatives Analysis Methods for Project-Level Environmental Impact Report/Environmental Impact Statement (EIR/EIS) Technical Memorandum* (December 2008).

1.1 PROJECT BACKGROUND

The CAHST Project will provide intercity HST service on over 800 route-miles of track throughout California, connecting the major population centers of Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego. The HST system is envisioned as a state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail technology, including state-of-the-art safety, signaling, and automated train-control systems. The trains will be capable of operating at speeds of up to 220 miles per hour (mph) over a fully grade separated alignment, with an expected express trip time between San Francisco and Los Angeles of 2 hours and 40 minutes.

1.1.1 Merced to Bakersfield Project EIR/EIS Background

The Authority has initiated project-level preliminary engineering and environmental review on eight individual sections of the statewide system. This study is a part of the engineering definition and environmental review of the HST system between Merced and Bakersfield, one of the eight segments of the system currently undergoing similar analyses:

- Sacramento to Merced
- San Jose to Merced
- San Francisco to San Jose
- Merced to Bakersfield
- Bakersfield to Palmdale
- Palmdale to Los Angeles
- Los Angeles to Anaheim
- Los Angeles to San Diego

With this study, the Authority will generate alternatives to be evaluated in detail during the environmental documentation for the HST system, under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). This technical memorandum focuses on the alternatives for the system in the rural area between Fresno and Bakersfield and identifies criteria for their comparison and differentiation.

The Merced to Bakersfield HST Project EIR/EIS will tier from the Final Statewide Program EIR/EIS and the Final Bay Area to Central Valley HST Program EIR/EIS in accordance with Council on Environmental Quality regulations and State CEQA Guidelines based upon all previous work prepared for and

incorporated in the Statewide Program EIR/EIS and the Bay Area to Central Valley HST Program EIR/EIS.

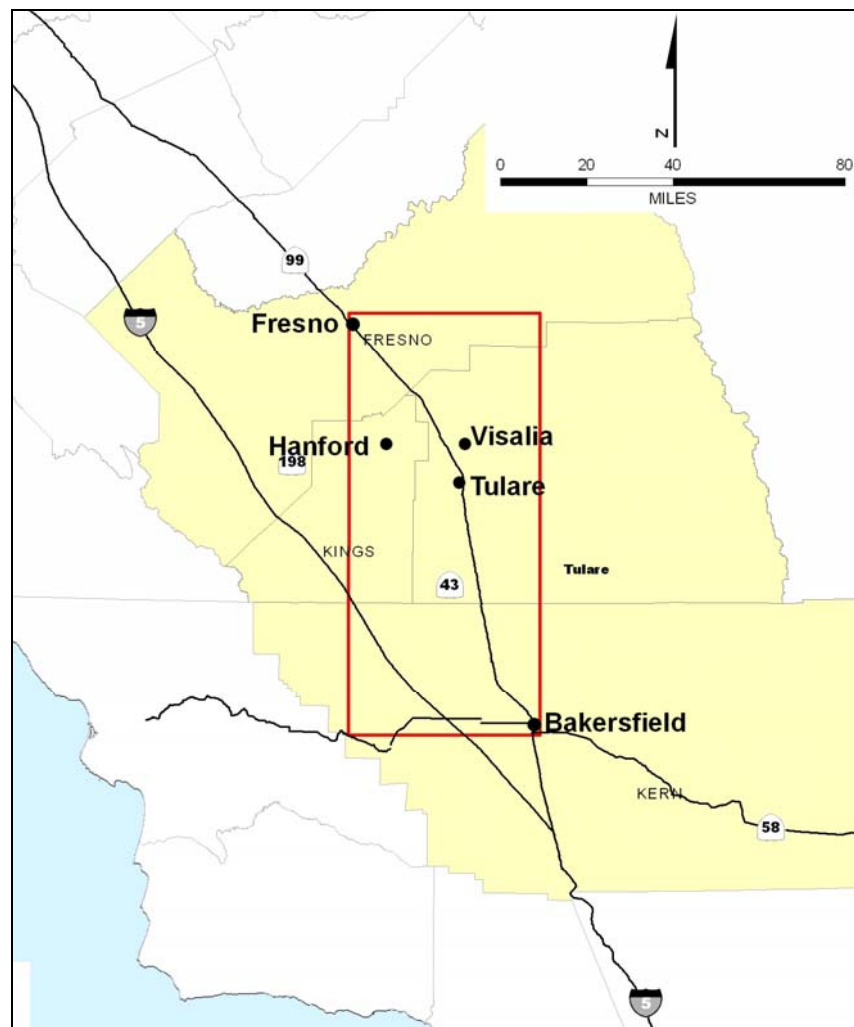
1.1.2 Study Area

The study area extends from East American Avenue south of Fresno to Hageman Road in the community of Rosedale in the north outskirts of Bakersfield.

The study area extends from just east of the Union Pacific Railroad (UPRR) railroad corridor which passes through the cities of McFarland, Delano, Earlimart, Tulare, Kingsburg, Selma and Fowler to just to the west of the BNSF Railway (BNSF) railroad corridor which passes through the cities of Shafter, Wasco, Corcoran, Hanford and Laton.

A map of the study area is shown in Figure 1.

Figure 1
Fresno to Bakersfield Rural Section Study Area



Key features in the Fresno to Bakersfield study area include:

- The cities of Laton, Hanford, Corcoran, Wasco, and Shafter to the west of the area of study,
- The cities of Selma, Kingsburg, Goshen, Visalia, Tulare, Tipton, Pixley, Earlimart, Delano and to the east of the area of study,
- The Allensworth State Historic Park,
- The Allensworth Ecological Reserve and Pixley National Wildlife Refuge,
- The Tule and Kings Rivers,
- Agricultural land. This is the majority land use throughout the study area,
- Commercial rail side properties. A number of these have rail loops or spurs, connected to the BNSF or UPRR and occur on both the western and eastern sides of the line. Some are regularly in use while others appear infrequently used, but could become more valuable assets with future developments, and
- The Visalia and Corcoran Airports.

1.2 ALTERNATIVES ANALYSIS PROCESS AND METHODOLOGY

The alternatives to be evaluated in the Project EIR/EIS for the Merced to Bakersfield region of the HST network will be defined via a two-step process, entailing an Initial Screening, followed by a Preliminary Alternatives Analysis.

The Initial Screening considers a broad range of alternatives, starting with the Preferred EIR/EIS Preferred Alignment identified in the Program EIR/EIS for the state-wide HST network. Additional alternatives are considered, developed by the URS/HMM/Arup Joint Venture Technical Team (Technical Team) with input from local stakeholders, that refine the Program EIR/EIS Preferred Alignment or that reflect a vital theme or concept, such as lowest travel time, alignment with another linear facility, alternative station locations or avoidance of known potential impacts. Other alternatives are considered that have been proposed via the public scoping process and are consistent with the HST project's Purpose and Need and system criteria.

The Initial Screening identifies major conflicts between any of the alternatives and such considerations as existing or planned development, environmentally sensitive land uses, and geometric constraints to HST operating speed. Some of these types of conflicts are immediately apparent via inspection of the study area and applicable maps and documents. The alternatives are further compared via a qualitative assessment of their relative impacts to the natural and man-made environments, the complexity of their construction and operation, and their fulfillment of HST system criteria. Results of this Initial Screening are discussed in Section 4.2 and presented in Appendix A. On the basis of the Initial Screening, a limited field of alternatives is suggested to advance to the Preliminary Alternatives Analysis.

Alternatives have been initially screened using the criteria identified in Section 2.2. This Initial Screening may result in a number of alternatives being eliminated. At this point in the project, a follow-up consultation with stakeholders through a series of workshops with the public and the Authority/Federal Railroad Administration (FRA) will be used to brief them on the Initial Screening analysis and to solicit additional input and specifically for the Authority/FRA to seek approval to advance the alternatives into the Preliminary Alternatives Analysis.

After this Initial Screening, the remaining alternatives will be refined and subjected to a Preliminary Alternatives Analysis. The Preliminary Alternatives Analysis will compare the smaller field of refined alternatives on the basis of more detailed and quantitative metrics. Upon completion of the Preliminary Alternatives Analysis, the Authority will determine which alternatives should be carried forward for more

detailed analysis during the project-level environmental documentation according to NEPA and CEQA guidelines.

1.3 PURPOSE OF THIS SCREENING MEMORANDUM

This Initial Screening Memorandum describes the metrics, data sources, and methodology used in the Initial Screening of alternatives for HST between Fresno and Bakersfield, and presents findings that support the selection of alternatives to be subjected to more detailed comparison in the subsequent Preliminary Alternatives Analysis. This Initial Screening process evaluates the alternatives based on engineering, operational and environmental criteria defined by the Authority in the Authority's *Alternatives Analysis Methods for Project-Level EIR/EIS Technical Memorandum (December 2008)*.

The purpose of the Initial Screening is not to accurately quantify impacts associated with individual alternatives, but to broadly differentiate among alternatives on the basis of criteria that will be applied in greater detail in the EIR/EIS process.

The Initial Screening analysis begins with the Program EIR/EIS Preferred Alignment selected at the conclusion of the 2005 Final Statewide Program EIR/EIS process. Public and agency comments in response to the Project EIR/EIS scoping processes and during ongoing interagency coordination meetings, and direction from the Authority and FRA were used to identify initial alternatives to carry forward for Initial Screening. After identifying the initial alternatives, alignment plans, profiles, and cross-sections have been developed and used for the Initial Screening analysis.

The main objectives of this memorandum are to document the Initial Screening process used to identify reasonable and feasible alternatives, and to identify those alternatives for which environmental issues (severe conflicts or constraints) or engineering constraints justify dropping them from further analysis. Alternatives are dropped from further consideration if they are not reasonable, practicable, and feasible. Major issues that could qualify an alternative to be dropped include:

- Alternative has environmental or engineering issues that would make approvals or implementation infeasible.
- Alternative produces unavoidable or difficult to mitigate environmental impacts.
- Alternative is not feasible or practicable to construct.
- Alternatives that when compared with similar alternatives are assessed to be less favorable.

2.0 SCREENING CRITERIA

As defined in the Authority's *Alternatives Analysis Methods for Project-Level EIR/EIS Technical Memorandum (December 2008)*, the alternatives were first defined by using system performance and design criteria to address the unique characteristics of HST operation. The alternatives were then subjected to the Initial Screening based on three general criteria also defined in the Authority's technical memorandum. This section outlines the HST Design Objectives and describes the development of Initial Screening criteria based on the Authority's guidance.

2.1 HST PERFORMANCE OBJECTIVES AND DESIGN CRITERIA

Initial alternative alignments and station locations have been developed to meet HST system performance objectives according to fundamental design criteria identified in Table 1.

Table 1
HST Performance Objectives and Design Criteria

Performance Objective	Design Criteria
Maximize ridership/revenue potential	<ul style="list-style-type: none"> Travel time Route length Speed
Maximize connectivity and accessibility	<ul style="list-style-type: none"> Intermodal connections
Minimize operating and capital costs	<ul style="list-style-type: none"> Construction, operations and maintenance issues and costs

Source: CAHST Alternatives Analysis Methods for Project EIR/EIS Technical Memorandum (December 2008)

2.2 INITIAL SCREENING CRITERIA

The Authority broadly defined the following three general criteria to be used in the Initial Screening of the alternatives:

- Severe Constraints
- Conflicts with Existing Conditions
- Conflicts with Approved Future Development in the Study Area

Based on these three criteria categories, the Technical Team defined and developed more specific metrics that were used to evaluate relative impacts among alternatives, and particularly to identify key differentiators (Table 2). Whereas the metrics used for comparison are generally quantitative, they support a qualitative, narrative evaluation of the alternatives, summarized in Section 4.0.

Table 2
Initial Screening Criteria and Data Sources

Criterion	Metric	Source
SEVERE CONSTRAINTS		
Engineering complexity	Number of miles of alignment elevated, at-grade, and below-grade	<ul style="list-style-type: none"> Concept drawings Aerial photography
	Number of major waterways (river and canals) crossed by the alignment	<ul style="list-style-type: none"> Concept drawings Aerial photography GIS data
Limiting speed	Lowest operating speed at any point on the alignment	<ul style="list-style-type: none"> Concept drawings
Railroad right-of-way access	Number of miles of alignment that require shared use of freight railroad rights-of-way	<ul style="list-style-type: none"> Concept drawings Aerial photography Discussions with freight railroads (if possible)
Public right-of-way access	Number of miles of alignment that require shared use of Caltrans/highway rights-of-way	<ul style="list-style-type: none"> Concept drawings Aerial photography Discussions with Caltrans (if possible)

Table 2
Initial Screening Criteria and Data Sources

Criterion	Metric	Source
Railroad operations	Number of active railroad sidings that will be severed by the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ Discussions with freight railroads (if possible) ▪ BNSF Track charts
Operational safety	Location of the alternative relative to property or features that could endanger safe HST operation	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography
CONFLICTS WITH EXISTING CONDITIONS		
Land use impacts	Station located relative to the host cities' designated central business district	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ Local planning documents ▪ GIS data ▪ input from local planning agencies
	Number of miles of the alignment that traverse agricultural (includes all definition of agricultural land) land	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data
Section 4(f) impacts	Number of Section 4(f) resources located within ¼-mile of the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data
Specific environmental impacts	Acres of wetlands within ¼-mile of alignment	<ul style="list-style-type: none"> ▪ GIS data
	Acres of vernal pools/complexes within ¼-mile of the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ GIS data
	No. of occurrences of threatened/endangered species within ¼-mile of alignments	<ul style="list-style-type: none"> ▪ Concept drawings ▪ GIS data
	Acres of 100-year floodplains within ¼-mile of the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ GIS data
	Acres of 500-year floodplains within ¼-mile of the alignments	<ul style="list-style-type: none"> ▪ Concept drawings ▪ GIS data
Community impacts	Number of miles of alignment that traverse incorporated communities and census-designated places	<ul style="list-style-type: none"> ▪ Concept drawings ▪ aerial photography ▪ GIS data ▪ County parcel data
	Number of census tracts of low income population (10% above the county established poverty line) within ¼-mile of the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ aerial photography ▪ GIS data ▪ County parcel data
	No. of sensitive receptors within ¼-mile of alignments (churches, schools, hospitals)	<ul style="list-style-type: none"> ▪ Concept drawings ▪ GIS data

Table 2
Initial Screening Criteria and Data Sources

Criterion	Metric	Source
Property impacts	Number of agricultural parcels traversed by the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ aerial photography ▪ GIS data ▪ County parcel data
	Number of residential parcels traversed by the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ aerial photography ▪ GIS data ▪ County parcel data
	Number of commercial parcels traversed by the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data ▪ County parcel data
	Number of industrial parcels traversed by the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data ▪ County parcel data
Connectivity	Integration of the station site with the existing road and traffic network	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ Local planning documents ▪ Input from local planning agencies
	Integration of the station site with the existing transit service network	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ Local planning documents ▪ Input from local planning agencies

Table 2
Initial Screening Criteria and Data Sources

Criterion	Metric	Source
APPROVED FUTURE DEVELOPMENT IN THE STUDY AREA		
Land use impacts	Number of parcels planned for development (commercial, industrial and residential) traversed by the alignment	<ul style="list-style-type: none"> Regional and local planning documents and land use analysis Input from local planning agencies County parcel data GIS data
	Number of parcels planned for development (commercial, industrial and residential) impacted by the station footprint	<ul style="list-style-type: none"> Concept drawings Aerial photography Local planning documents Input from local planning agencies
Public and political support	Support for the alternative by regional/local plans and policies	<ul style="list-style-type: none"> Regional and local planning documents and land use analysis Input from local planning agencies

3.0 ALTERNATIVES CONSIDERED

The HST alignment alternatives considered in the Initial Screening for the rural section of the project between Fresno and Bakersfield include the Program EIR/EIS Preferred Alignment, alternatives developed by the Technical Team for this segment with local stakeholder input, and alternatives generated in response to public scoping.

3.1 ALIGNMENT ALTERNATIVES

A schematic of alternative HST alignments through the study area is shown in Figure 2. The alternatives are summarized in Table 3, including options applicable to one or more of the principal alternatives to address local issues or constraints.

3.1.1 Program EIR/EIS Preferred Alignment

The HST corridor between Fresno and Bakersfield is a portion of the Merced to Bakersfield segment of the HST project, evaluated in the Program EIR/EIS within the Sacramento-Bakersfield Study Area.

Between Fresno and Bakersfield, the section that is the subject of this memorandum, the Preferred Alignment identified in the Program EIR/EIS is located generally alongside the BNSF alignment from south of Fresno to Rosedale, northwest of Bakersfield.. The alignment by-passes Hanford to the west, leaving the BNSF corridor to the south of Laton and rejoining north of Corcoran. The alignment passes through or close to the cities of Laton, Corcoran, Wasco, and Shafter. It provides no station location along this section of the route.

The Program EIR/EIS, while providing no station between Fresno and Bakersfield, recognized public and agency support for a station in the vicinity of Visalia, Tulare and Hanford and the Authority undertook to complete an additional study of an alignment option between Fresno and Bakersfield, or variations thereof, to serve a potential Visalia station located in an existing and/or planned urbanized area prior to the commencement of project-level environmental review for this segment.

The following alignment and station location was selected as the Preferred Alternative:

Alignment Alternative	Alignment Description	Station Location
Program EIR / EIS Preferred Alignment	Fresno to Bakersfield: BNSF rail alignment from south of Fresno to Bakersfield (Truxton Station), by-pass to west of Hanford between Corcoran and Laton,	None, further study for location in Visalia, Tulare and Hanford area.

3.1.2 Visalia-Tulare-Hanford Station Alternatives

In accordance with undertakings in the Program Level EIR/EIS, a project level study of alignment alternatives that would service potential station locations in the Visalia, Tulare and Hanford areas was carried out. This study was completed by the project team, with input from the public and agencies, in August 2007. The study identified 13 initial alternatives which followed either the UPRR or the BNSF rail corridors with local by-passes and greenfield deviations. Review of the alternatives during the study resulted in further development of some alternatives and rejection of others such that eight alternatives with five station locations were identified as feasible and subject to engineering and environmental assessment. This process did not select preferred alternatives and therefore the eight alternatives have been carried forward into this initial screening process.

A full description of the feasibility is provided in the *Visalia-Tulare-Hanford Station Feasibility Study* (August 2007).

3.1.3 Technical Team Generated Alternatives

Development of the Program Level Alternative

The *Visalia-Tulare-Hanford Station Feasibility Study* identified a potential alignment which generally follows the BNSF corridor from the south of Fresno to the north of Bakersfield, with the exception of the portion of the alignment running between locations south of Conejo and north of Corcoran. This portion of the alignment follows State Route 43 to the east of Hanford, providing a potential station site at the crossing of State Route 198. This alignment was used by the Technical Team as the base for further development of BNSF corridor alternatives.

The alignment was considered in geographical sections and a number of local options considered within each section. The alignments were also designed to:

- Achieve 250 mph design speed
- Provide a station in the area of the State Route 43/State Route 198 interchange east of Hanford
- Follow the BNSF where possible except at the Hanford bypass
- Provide options for mitigating impacts in the areas of the cities of Corcoran, Wasco and Shafter.

The options investigated for each section of the route are described below:

South of Fresno (American Avenue) to State Route 198 (Proposed station location)

From south of Fresno at American Avenue, the alignment runs along the BNSF alignment before it diverts from BNSF to cross northwest over agricultural land to north of the proposed station location near the State Route 43/State Route 198 interchange. Options considered for this section are:

- Tie in to the BNSF as soon as possible, south of Elkhorn Avenue
- Tie in with a smoother curve to the south of Mountain View Avenue

All options assume that the HST crosses the BNSF at the point that it rejoins the BNSF corridor.

State Route 198 (Proposed station location) to Corcoran

This section covers the alignment from the proposed station location near the State Route 43/State Route 198 interchange to where it rejoins the BNSF alignment near Corcoran. Options here are somewhat influenced by the solution at Corcoran (see below).

Options south of Highway 198 comprise:

- Immediately east of Highway 43
- One to two field blocks east of Highway 43

Corcoran

Options for the location of the HST alignment in the vicinity of the City of Corcoran have been identified separately as the location of HST through the city. These options could have significant potential impacts on rail-connected industries, community cohesion, highways and properties.

In order to preserve the station location at Hanford, the HST alignment must leave the BNSF alignment to the east. Only diversions to the east of Corcoran have therefore been considered. The complete list of options is as follows:

- At-grade through Corcoran, following the BNSF
- Elevated through Corcoran, following the BNSF
- In trench through Corcoran, following the BNSF
- Bypass to the east of Corcoran
- Bypass to an alignment through less developed land on the eastern side of Corcoran

The through city HST alignment and bypass options are shown in Figure 2.

Corcoran to the North of Wasco

This section covers largely undeveloped farmland and parkland. There are a small number of rail-connected businesses along this route, two curves on the BNSF alignment which would not allow for the 250 mph design speed, and Allensworth State Historic Park which is located on the western side the BNSF tracks approximately half way between Corcoran and Wasco. The options at Corcoran and Wasco have some influence on the alignment in between, however the distance between Corcoran and Wasco is sufficiently long to allow independent evaluation of potential HST alignments between these cities. Options proposed for this section of the alignment are:

- Western side of the BNSF
- Eastern side of the BNSF and State Route 43
- Eastern side of the BNSF and west of State Route 43

These options were developed for the full design speed of 250 mph. Lower design speeds were considered to allow closer following of the BNSF alignment; however, such options were not found to provide great benefit and did not satisfy the high speed objective of the project.

It should also be noted, that in order to minimize the final transportation corridor width, it may be possible to divert the BNSF tracks onto a new 250 mph rail corridor adjacent to the HST alignment and release the land currently occupied by the slower speed BNSF alignment. This will require new BNSF lines to be constructed, but will avoid the development of thin slivers of land between the BNSF and HST alignments, which may be uneconomical to farm.

North of Wasco to North of Bakersfield (Hageman Road)

This section covers the two urban centers of Wasco and Shafter, where the location of HST through the cities could have a significant impact on rail-connected industries, community cohesion, highways and properties. There is also an existing BNSF curve between the two cities which is too tight for the 250 mph design speed. Therefore the following options were considered:

- At-grade through Wasco and Shafter, following the BNSF
- Elevated through Wasco and Shafter, following the BNSF
- Elevated through Wasco and Shafter, following the BNSF corridor but elevating the BNSF lines
- In trench through Wasco and Shafter, following the BNSF
- In trench through Wasco and Shafter, following the BNSF corridor but lowering the BNSF into trench
- Diverting to the west of Wasco and Shafter
- Diverting to the east of Wasco and Shafter

The through cities HST alignment and bypass options are shown in Figure 2.

Straight Alternatives

Development of the program level alternatives identified a number of constraints to alignments running close and parallel to the BNSF tracks. These included:

- Severance of BNSF spurs
- Wide transportation corridor between Corcoran and Wasco containing BNSF, State Route 43 and HST
- Significant inaccessible land between HST and State Route 43 as result of different curve radii for BNSF against HST
- Significant construction associated with grade crossings
- Impacts for through city options in Corcoran, Wasco and Shafter.

As a result, more direct alignments were investigated through the area. These alternatives preserved a potential station location to the east of Hanford.

3.1.4 Scoping Comment Alternatives

Public scoping meetings were held in Fresno, Visalia and Bakersfield in March 2009. Comments were received from the public and agencies during the scoping period. A number of comments suggested potential alignments for this section of the project.

Numerous comments made during the scoping process suggested alignment configurations that were already under consideration, either because the suggestion matched the Program EIR/EIS Preferred Alignment, or one of the refinements of that alignment developed by the Technical Team, or the suggested alternative matched one of the alternatives developed during the *Visalia-Tulare-Hanford Station Feasibility Study*. Suggestions falling into this category did not result in the creation of new alternatives, and these suggestions are not tracked separately in Table 3. Scoping suggestions falling into this category are:

- Support for alignments in the BNSF corridor south of Fresno
- Support for alignments in the UPRR/State Route 99 corridor
- Support for alignments in the State Route 43 corridor east of Hanford

Specific alignment suggestions received through the scoping process are as follows:

- **Elevated in State Route 99/UPRR corridor** – This is consistent with a number of the alternatives developed in the *Visalia-Tulare-Hanford Station Feasibility Study* (B-1, B-2, D-1, D-2, E-1 and E-2). Elevated segments may be used to mitigate potential impacts. These alternatives are considered in the Initial Screening.
- **Along State Route 99, east of State Route 99** – UPRR/State Route 99 corridor covered by Alternatives B-1 and B-2. Alignments using the UPRR alignment out of Bakersfield were rejected in the Program EIR/EIS.

The following lists alignment proposals received during the scoping process for alignment alternatives that did not match the Program EIR/EIS Preferred Alignment or one of the alignment alternatives developed for the *Visalia-Tulare-Hanford Station Feasibility Study*, and describes how they are treated in the screening process, as shown in Table 3:

- **I-5 corridor** – This alternative was considered and rejected in the Program EIR/EIS as it does not meet the Purpose and Need of the project to directly serve the downtown areas of Fresno and Bakersfield, and adds significant mileage and travel time. For these reasons it is considered that this alternative should not be evaluated further.
- **Follow State Route 99 northwards out of Bakersfield then turn northwesterly to a point north of Whistler Road** – Alignments using State Route 99/UPRR alignment into Bakersfield were rejected in the Program EIR/EIS as they do not serve the Truxton Station location. For this reason it is considered that this alternative should not be evaluated further.
- **UPRR alignment out of Bakersfield and then angle north to meet the BNSF alignment north of State Route 46** – Alignments using State Route 99/UPRR alignment into Bakersfield were rejected in the Program EIR/EIS as they do not serve the Truxton Station location. For this reasons it is considered that this alternative should not be evaluated further.

As described above no new alignments were identified from the scoping process which met the Purpose and Need of the project.

Figure 2
Fresno to Bakersfield Initial Alternatives

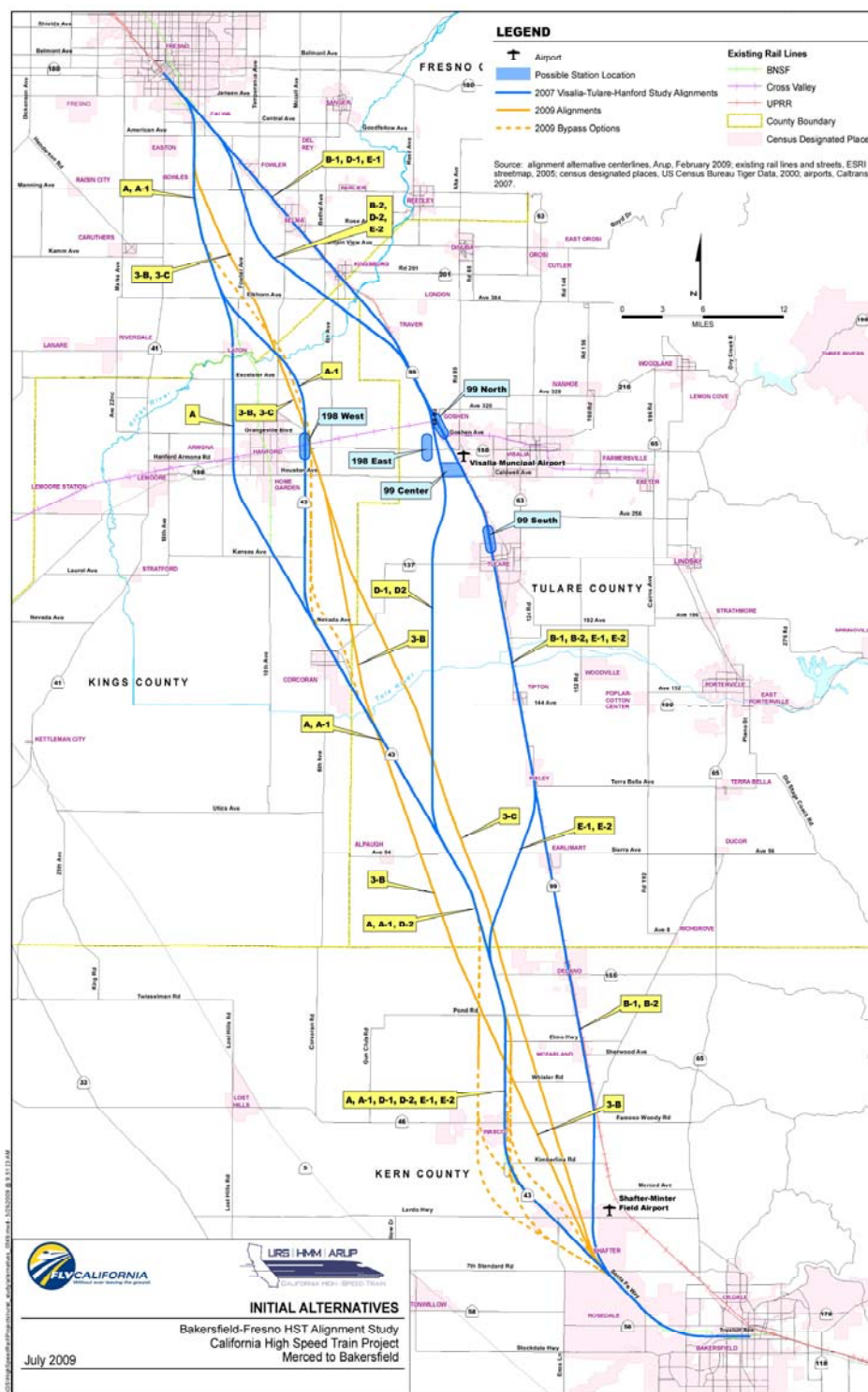


Table 3
Merced to Bakersfield (Fresno-Bakersfield Study)
Alignments to be Carried Forward for Initial Screening

Alternative Group	Ref. No.	Alt. No.	Alternative/Option Description	Origin	Scope	Predominant Profile	Station Location	Theme / Comments
Program EIR/EIS Preferred Alignment	R-1	LPA	BNSF - Hanford West Bypass	Program EIR/EIS	Full Alignment Alternative	At Grade	None	<ul style="list-style-type: none"> Preferred alignment from Program EIR/EIS Uses BNSF corridor throughout except for western bypass of Hanford. Passes through Laton. Small easterly bypasses at Corcoran and Wasco. Elevated through Shafter.
	R-3	A-1	BNSF - Hanford East Bypass	Modified Program EIR/EIS from V-T-H Station Feasibility Study	Full Alignment Alternative	At Grade	198 West	<ul style="list-style-type: none"> Revised version of Program EIR/EIS alignment serving station site in Visalia-Tulare-Hanford area. Uses BNSF corridor throughout except for eastern bypass of Hanford between location south of Conejo and location north of Corcoran. Follows State Route 43 alignment for eastern bypass of Hanford. Local variations of vertical alignments through and by-passes around Corcoran. Wasco and Shafter also studied.
Visalia-Tulare-Hanford (VTH) Station Feasibility Study	R-4	B-1	UPRR – Fresno-South Below Grade	V-T-H Station Feasibility Study	Full Alignment Alternative	Below grade, at-grade	99 North or 99 Center or 99 South	<ul style="list-style-type: none"> Uses existing UPRR corridor throughout, except placed below-grade through portions of the cities of Fowler, Selma, and Kingsburg in south Fresno County. Crosses over from UPRR south of McFarland to BNSF south of Shafter to provide access to the Bakersfield Truxtun station location.
	R-5	B-2	UPRR – Fresno-South Bypass	V-T-H Station Feasibility Study	Full Alignment Alternative	At-grade	99 North or 99 Center or 99 South	<ul style="list-style-type: none"> Uses existing UPRR corridor throughout, except uses western bypass of cities of Fowler, Selma, and Kingsburg in south Fresno County. Crosses over from UPRR south of McFarland to BNSF south of Shafter to provide access to the Bakersfield Truxtun station location.

Table 3
Merced to Bakersfield (Fresno-Bakersfield Study)
Alignments to be Carried Forward for Initial Screening

Alternative Group	Ref. No.	Alt. No.	Alternative/Option Description	Origin	Scope	Predominant Profile	Station Location	Theme / Comments
Visalia-Tulare-Hanford (VTH) Station Feasibility Study	R-6	D-1	UPRR to BNSF (198 Station) - Fresno-South Below Grade	V-T-H Station Feasibility Study	Full Alignment Alternative	Below grade, at-grade	198 East or 99 Center	<ul style="list-style-type: none"> Uses existing UPRR corridor between Fresno and location between Kingsburg and Goshen Junction, except placed below-grade through portions of the cities of Fowler, Selma, and Kingsburg in south Fresno County. Crosses over to BNSF between location south of Kingsburg on UPRR to location between Corcoran and Allensworth State Historic Park on BNSF. Follows BNSF to Bakersfield Truxtun station.
	R-7	D-2	UPRR to BNSF (198 Station) - Fresno-South Bypass	V-T-H Station Feasibility Study	Full Alignment Alternative	At-grade	198 East or 99 Center	<ul style="list-style-type: none"> Uses existing UPRR corridor between Fresno and location between Kingsburg and Goshen Junction, except uses western bypass of cities of Fowler, Selma, and Kingsburg in south Fresno County. Crosses over to BNSF between location south of Kingsburg on UPRR to location between Corcoran and Allensworth State Historic Park on BNSF. Follows BNSF to Bakersfield Truxtun station.
	R-8	E-1	UPRR to BNSF (99 Station) – Fresno-South Below Grade	V-T-H Station Feasibility Study	Full Alignment Alternative	Below grade, at-grade	99 North or 99 Center or 99 South	<ul style="list-style-type: none"> Uses existing UPRR corridor between Fresno and location between Tulare and Earlimart, except placed below-grade through portions of the cities of Fowler, Selma, and Kingsburg in south Fresno County. Crosses over from UPRR at location between Tulare and Earlimart to BNSF at location south of Allensworth State Historic Park. Continues on BNSF to Bakersfield Truxtun station.

Table 3
Merced to Bakersfield (Fresno-Bakersfield Study)
Alignments to be Carried Forward for Initial Screening

Alternative Group	Ref. No.	Alt. No.	Alternative/Option Description	Origin	Scope	Predominant Profile	Station Location	Theme / Comments
Visalia-Tulare-Hanford (VTH) Station Feasibility Study	R-9	E-2	UPRR to BNSF (99 Station)–Fresno-South Bypass	V-T-H Station Feasibility Study	Full Alignment Alternative	At-grade	99 North or 99 Center or 99 South	<ul style="list-style-type: none"> Uses existing UPRR corridor between Fresno and location between Tulare and Earlimart, except uses western bypass of cities of Fowler, Selma, and Kingsburg in south Fresno County. Crosses over from UPRR at location between Tulare and Earlimart to BNSF at location south of Allensworth State Historic Park. Continues on BNSF to Bakersfield Truxtun station.
	R-15	3-B	BNSF - South of Corcoran West	Project team	Full Alignment Alternative	Elevated	198 West	<ul style="list-style-type: none"> Uses new corridor east of BNSF north of Hanford, runs east of State Route 43 south of Hanford station, and then uses a new corridor west of BNSF alignment south of Corcoran. Largely elevated configuration proposed by Department of Fish and Game to reduce impacts.
Developed by Project Team as Refinements of Program EIR/EIS Preferred Alignment	R-16	3-C	BNSF - Straight alignment	Project team	Full Alignment Alternative	Elevated	198 West	<ul style="list-style-type: none"> Uses a new near-straight corridor from Bakersfield through Hanford station to Fresno. Runs east of BNSF north of Hanford, east of State Route 43 south of Hanford station, and then stays east of BNSF alignment past Corcoran, Wasco and Shafter. Largely elevated configuration proposed by Department of Fish and Game to reduce impacts.
	R-34	I-5	I-5 Corridor Fresno to Bakersfield	Public scoping - (City of Hanford)	Full Alignment Alternative	Not specified in comment	Not specified in comment	<ul style="list-style-type: none"> I-5 Corridor considered and rejected in Program EIR/EIS Alternatives Analysis Does not meet Purpose and Need of project to directly serve downtowns of Fresno and Bakersfield. Adds significant mileage and travel time. Rejected prior to Initial Screening based on Program EIR/EIS rejection.

Table 3
Merced to Bakersfield (Fresno-Bakersfield Study)
Alignments to be Carried Forward for Initial Screening

Alternative Group	Ref. No.	Alt. No.	Alternative/Option Description	Origin	Scope	Predominant Profile	Station Location	Theme / Comments
Suggested in Public Scoping	R-35	State Route 99 Elevated	State Route 99 Corridor Fresno to Bakersfield	Public scoping - (City of Visalia)	Full Alignment Alternative	Elevated	198 East	<ul style="list-style-type: none"> Elevated segments may be used to mitigate potential impacts in specific locations for alternatives developed in the <i>Visalia-Tulare-Hanford Station Feasibility Study</i> in the State Route-99/UPRR corridor (B-1, B-2, D-1, D-2, E-1 and E-2) if they pass initial screening. Not screened separately - suggested alignment covered by screening for alternatives B-1, B-2, D-1, D-2, E-1 and E-2.
	R-36	UPRR/ BNSF	UPRR Corridor through Bakersfield, transitioning to BNSF north of Wasco	Public scoping (multiple comments)	Full Alignment Alternative	Not specified in comment	Not specified in comment	<ul style="list-style-type: none"> Alignment using State Route 99/UPRR alignment into Bakersfield rejected in Program EIR/EIS. Does not allow access to Truxtun Station location in Bakersfield. Rejected prior to Initial Screening based on Program EIR/EIS rejection.
	R-38	State Route 99 East	State Route 99 Corridor, east of State Route 99	Public scoping	Full Alignment Alternative	Not specified in comment	Not specified in comment	<ul style="list-style-type: none"> State Route 99/UPRR corridor covered by alternatives B-1 and B-2. Alignment using UPRR corridor all the way into Bakersfield rejected in Program EIR/EIS – does not allow access to Truxtun Station site. Alignment east of State Route 99 corridor cities rejected in Program EIR/EIS (East 99). Rejected prior to Initial Screening based on Program EIR/EIS rejection, and inclusion of B-1 and B-2 in Initial Screening.
	R-44	State Route 99	State Route 99/UPRR Corridor from Fresno to Bakersfield	Public scoping (multiple comments)	Full Alignment Alternative	Not specified in comment	Not specified in comment	<ul style="list-style-type: none"> State Route 99/ UPRR corridor covered by alternatives B-1 and B-2. Alignment using UPRR corridor all the way into Bakersfield rejected in Program EIR/EIS - does not allow access to Truxtun Station site. Rejected prior to Initial Screening based on Program EIR/EIS rejection, and inclusion of B-1 and B-2 in Initial Screening.

Table 3
Merced to Bakersfield (Fresno-Bakersfield Study)
Alignments to be Carried Forward for Initial Screening

Alternative Group	Ref. No.	Alt. No.	Alternative/Option Description	Origin	Scope	Predominant Profile	Station Location	Theme / Comments
	R-45	Center of Valley	Center of Valley near State Route 99 Corridor	Public scoping	Full Alignment Alternative	Not specified in comment	Not specified in comment	<ul style="list-style-type: none"> Alignment in center of valley west of State Route 99 corridor cities rejected in Program EIR/EIS (West 99). Rejected prior to Initial Screening based on Program EIR/EIS rejection.

Note: Alternative numbers were developed for each alignment during development of the alternatives. For consistency a reference number has been added. Alternatives are numbered as reference number/alternative number (R1/A1)

3.2 PRELIMINARY STATION LOCATIONS

The *Visalia-Tulare-Hanford Station Feasibility Study* identified five potential station sites which would provide service to the cities of Visalia, Tulare and Hanford. The Station Investigation Area for each alignment alternative is defined below and illustrated in Figure 3. It is noted that these areas define the possible extents of a future high speed rail station. The actual footprint of the station is expected to be approximately 200,000 square feet, depending on the program elements and height of the facility.

Any proposed Tulare/Visalia/Hanford station would be categorized as a Category VI station (the smallest and least utilized stations with under 200 peak hour passengers), as projections have estimated some 316 daily passengers or 26 per peak hour. As a Category VI station, the Tulare/Visalia/Hanford station would have a desired size of 11,880 square feet. Required parking is estimated at 62 vehicles, although this is rounded to 100 spaces for planning purposes.

Based on the Authority's *Engineering Criteria Manual* (January 2004), all of the HST station platforms must be on tangent (straight) track and all platforms must be on sidings off of the mainline to allow non-stop express trains to operate through each station at full line speed (220 mph). Platforms must be 1,320 feet long, be on tangent track, and be no closer to a curve than 560 feet.

198 West: Station to the east of Hanford in the vicinity of the State Route 43/State Route 198 junction

The proposed 198 West Station is situated about 3.0 miles east of Hanford and would be served by alignment Alternative R-3/A-1.

198 East: Station on the State Route 198 to west of State Route 99

The proposed 198 East Station is situated approximately 1.0-1.5 miles southwest of the State Route 198/State Route 99 interchange (southwest quadrant), across State Route 99 from the Visalia Airport (slightly south of the Cross-Valley Rail Line). Within the State Route 198 corridor, the 198 East Station could be served by alignment Alternatives R-6/D-1 and R-7/D-2.

99 North: Station on State Route 99 to north of Visalia

The proposed 99 North Station is located near the Goshen Junction, in the northeastern quadrant of the State Route 198/State Route 99 interchange. Within the State Route 99 corridor, the 99 North Station could be served by alignment Alternatives R-4/B-1, R-5/B-2, R-6/D-1, R-7/D-2, R-8/E-1, and R-9/E-2.

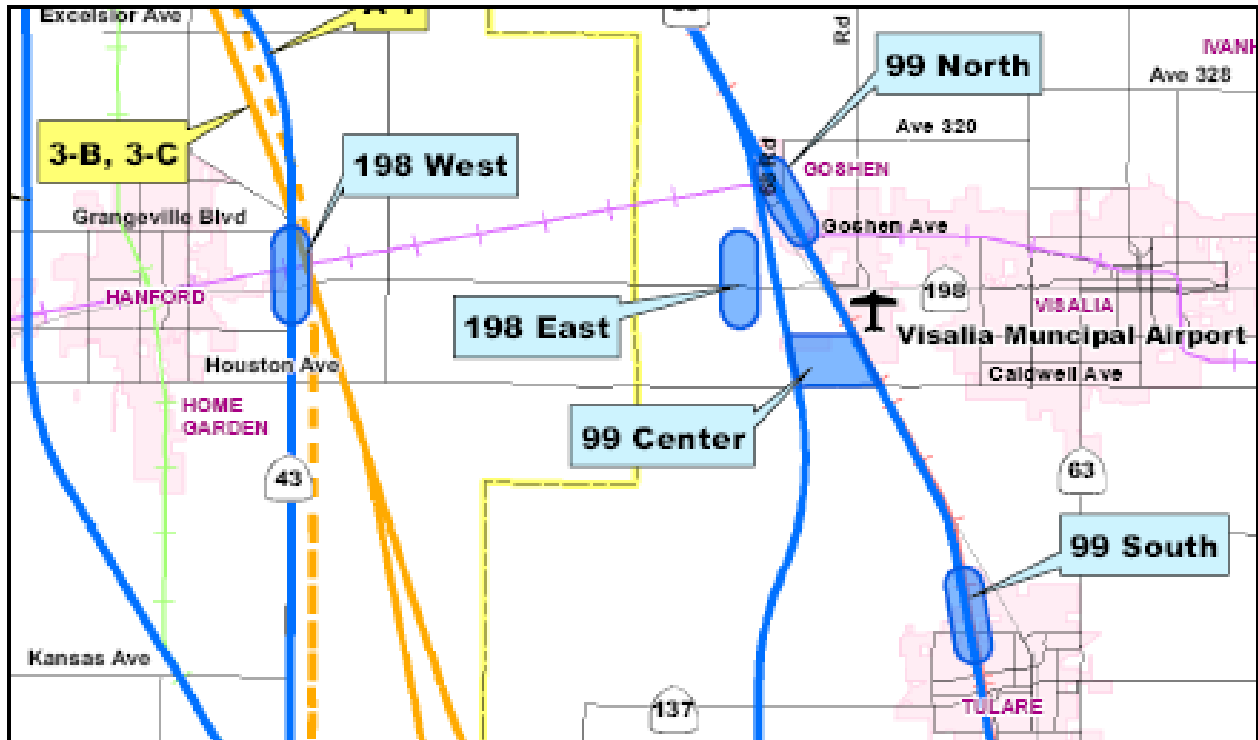
99 Central: Station on State Route 99 to west of Visalia

The proposed 99 Central Station is located on a site owned by the City of Visalia, about 4.5 miles west of Visalia proper, southwest of the Visalia Airport (north of Caldwell Avenue). The 99 Central Station could be served by alignment Alternatives R-4/B-1, R-5/B-2, R-6/D-1, R-7/D-2, R-8/E-1, and R-9/E-2. It is located adjacent to the State Route 99 north-south corridor, while being 1.0 mile south of State Route 198, which runs east-west and connects to Hanford.

99 South: Station on State Route 99 to north of Tulare

The proposed 99 South Station is located on the northern side of Tulare, centered on Prosperity Avenue. The 99 South Station could be served by alignment Alternatives R-4/B-1, R-5/B-2, R-8/E-1, and R-9/E-2. It is located 1.0 miles west of the north-south State Route 99 corridor.

Figure 3
Visalia-Tulare-Hanford Station Investigation Areas



4.0 INITIAL SCREENING RESULTS AND CONCLUSIONS

This section presents the analysis of the initial screening of the alternatives. Each of the alternatives is discussed in response to the evaluation criteria, with pros and cons, major concerns, a conclusion and suggested disposition of the alternative. Station locations are defined and evaluated as integral parts of the alternatives and are addressed in the respective descriptions and discussions of the alternatives.

4.1 OBJECTIVE AND PROCESS

The evaluation process resulted in the population of a matrix that tabulates the metrics of each alternative and option according to the criteria presented in Table 4. The complete summary of the Initial Screening is presented in matrix form as Appendix A. The numeric scores with which the matrix is populated have been reviewed and the range of scores for each criterion parsed into ranges of generally high, medium and low impact, the lower range being preferable to the higher range. These ranges and the scores of each alternative illuminate both (a) gross differentiators among the alternatives and (b) the relative impacts of all the alternatives and options. These ranges and differentiators are the basis for narrative discussion of the alternatives and their further consideration in Preliminary Alternative Analysis.

Table 4
Initial Screening Criteria and Scoring Ranges

Criterion	Metric	Scoring Range
SEVERE CONSTRAINTS		
Engineering complexity	<u>Number of miles</u> of alignment elevated, at-grade, and below-grade	<ul style="list-style-type: none"> High impact Medium impact Low impact
	<u>Number of major waterways</u> (river and canals) crossed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
Limiting speed	<u>Lowest operating speed</u> at any point on the alignment	<ul style="list-style-type: none"> < 219 mph 220 – 249 mph > 250
Railroad right-of-way access	<u>Number of miles</u> of alignment that require shared use of freight railroad rights-of-way	<ul style="list-style-type: none"> High impact Medium impact Low impact
Public right-of-way access	<u>Number of miles</u> of alignment that require shared use of Caltrans/highway rights-of-way	<ul style="list-style-type: none"> High impact Medium impact Low impact
Railroad operations	<u>Number of active railroad sidings</u> that will be severed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
Operational safety	Does the alternative traverse property or features that could <u>endanger safe HST operation</u> ?	<ul style="list-style-type: none"> Yes Unable to determine No
CONFLICTS WITH EXISTING CONDITIONS		
Land use impacts	Is the station located in the cities' designated <u>central business district</u> ?	<ul style="list-style-type: none"> No Unable to determine Yes
	<u>Number of miles</u> of the alignment that traverse agricultural (includes all definition of agricultural land) land	<ul style="list-style-type: none"> High impact Medium impact Low impact
Section 4(f) impacts	<u>Number of Section 4(f) resources</u> located within ¼-mile of the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
Specific environmental impacts	Acres of wetlands within ¼-mile of alignment	GIS data
	Acres of vernal pools/complexes within ¼-mile of the alignment	GIS data
	No. of occurrences of threatened/endangered species within ¼-mile of alignments	GIS data

Table 4
Initial Screening Criteria and Scoring Ranges

Criterion	Metric	Scoring Range
	Acres of 100-year floodplains within ¼-mile of the alignment	<ul style="list-style-type: none"> GIS data
	Acres of 500-year floodplains within ¼-mile of the alignments	<ul style="list-style-type: none"> GIS data
Community impacts	<u>Number of miles</u> of alignment that traverse incorporated communities and census-designated places	<ul style="list-style-type: none"> High impact Medium impact Low impact
	<u>Number of census tracts</u> of low income population (10% above the county established poverty line) within ¼-mile of the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
Property impacts	<u>Number of agricultural parcels</u> traversed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
	<u>Number of residential parcels</u> traversed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
	<u>Number of commercial parcels</u> traversed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
	<u>Number of industrial parcels</u> traversed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
Connectivity	How well does the station site mesh with the <u>existing road and traffic network</u> ?	<ul style="list-style-type: none"> Poorly Average Well
	How well does the station site mesh with the <u>existing transit service network</u> ?	<ul style="list-style-type: none"> Poorly Average Well
APPROVED FUTURE DEVELOPMENT IN THE STUDY AREA		
Land use impacts	<u>Number of parcels</u> planned for development (commercial, industrial and residential) traversed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
	<u>Number of parcels</u> planned for development (commercial, industrial and residential) impacted by the station footprint	<ul style="list-style-type: none"> High impact Medium impact Low impact
Public and political support	Is the alternative supported by <u>regional/local plans and policies</u> ?	<ul style="list-style-type: none"> No Unable to determine Yes

4.2 ALTERNATIVE SCREENING FINDINGS – ALIGNMENT ALTERNATIVES

4.2.1 R1/LPA Program EIR/EIS Preferred Alignment (BNSF – Hanford West Bypass)

Pros

- Relatively low engineering complexity because a majority of the alignment is at-grade, less complex than elevated or below grade construction, although full impact of existing highways crossings is yet to be evaluated.
- Close to BNSF tracks, potential for sharing the right-of-way (ROW). Opportunity to provide grade separation for BNSF.
- This alternative is ranked “Low” in terms of potential impacts on commercial parcels.
- This alternative is ranked “Low” in terms of potential impacts on sensitive receptors.

Cons

- This alternative does not provide a station. The addition of a station to the west of Hanford would not provide reasonable service to Visalia or Tulare, and a station location west of Hanford is not supported by local policies.
- Based on scoping comments this alternative does not have significant public or agency support.
- This alternative passes through the center of Laton at grade. Providing grade separation would introduce significant construction complexity in this area and would have a significant impact on the existing road network.
- This alternative could have potential impacts on Section 4(f) properties, which are primarily located within ¼-mile of the alignment within the cities of Corcoran and Shafter and within Allensworth Historic Park. The alignment is located adjacent to a public park in the City of Corcoran; within the Allensworth Historic District, a Section 4(f) property; and within ¼-mile of three other historic properties in this locality. This alternative is also located adjacent to Mannel Park north of the City of Shafter, and could potentially affect one other historic property in this locality.
- This alternative is ranked “High” in terms of miles of the alignment that traverse agricultural land.
- This alternative is ranked “High” in terms of industrial parcels impacted.
- This alternative is ranked “High” in terms of potential impacts on parcels planned for future development.
- This alignment is located adjacent to Pixley National Wildlife Refuge and Allensworth Ecological Reserve.
- The alignment follows the BNSF tracks and as such will result in the severing of spurs currently serving BNSF customers.
- The alternative is generally not supported by local and regional plans and policies and jurisdictions.

Major concerns

- Potential impacts on Section 4(f) properties would require further analysis and investigation. However, as this alternative uses the existing BNSF corridor, it is anticipated that such impacts may not be substantial and could potentially be avoided or mitigated.
- The alternative does not provide a suitable station location that would adequately service Visalia or Tulare.

Conclusion

This alternative represents the preferred alignment from the Program EIR/EIS. Potential impacts on Section 4(f) properties would require further analysis and investigation. Construction impacts such as severance to BNSF spur tracks and impacts on the cities are similar to the R3/A-1 alternative. However, this alternative does not satisfy the desire recognized in the program document for a station in the Visalia

area. As a station is required in this area, it is considered that this alternative should not be evaluated further.

4.2.2 R3/A1 BNSF – Hanford East Bypass

This alternative is a refinement of the Program EIR/EIS Preferred Alignment, with the bypass of Hanford modified to be located to the east of Hanford, in order to serve a potential station site. As discussed in Section 3.1.3 this alignment has been split into a number of sections and local options considered. A discussion of options at each location is provided below. This is followed by a general discussion of the pros and cons of this alternative.

South of Fresno (American Avenue) to State Route 198 (Proposed station location)

The pros and cons of the options considered are as follows:

- Tie in with a smoother curve to the south of Mountain View Avenue: This is a marginally shorter route which increases agricultural land take, but has a reduced impact of BNSF operations.
- Tie in to the BNSF as soon as possible, south of Elkhorn Avenue: This option minimizes the amount of agricultural land used, but may have a bigger impact on existing rail spurs and sidings

It is considered that both options should be evaluated further.

State Route 198 (Proposed station location) to Corcoran

Options south of Highway 198 comprise:

- Immediately east of Highway 43: This option minimizes the combined width of the transportation corridor, but does not provide sufficient distance between the highway and HST to provide ramps for bridges over the HST. Access between Highway 43 and the rural roads to the east of the HST would require road users to first travel west up a ramp and cross back over the highway and HST. This is a situation similar to that found alongside the BNSF around Allensworth. Locating the HST immediately east of Highway 43 would also potentially impact a landfill site along this corridor. This alternative also places the station too close to the State Route 43/State Route 198 interchange. For these reasons it is considered that this alternative should not be evaluated further.
- Further to east of Highway 43 (1 to 2 field blocks): Providing the HST corridor further to the east of Highway 43 provides sufficient room to retain the at-grade junctions between the rural roads and the highway and provide ramps between the Highway and HST. The space between the highway and HST would likely be sufficient to be economically farmed. For these reasons it is considered that this alternative should be evaluated further.

Corcoran

Central Corcoran has an extensive area of sidings and rail-connected customers and an Amtrak station as shown in Photo 1. The at-grade solution is presented as a base case for the through city options. Bypass options for the east side only have been developed to serve the alignment requirements north and south of the city.

The Program EIR/EIS indicated a bypass to the east of Corcoran which crosses the BNSF tracks to the north of Corcoran at the start of the western bypass to Hanford. Discussions with the City of Corcoran indicated support for both a through city viaduct and for bypass solutions.

**Photo 1
Corcoran**



- At-grade through Corcoran, following the BNSF: This is considered the base case, and while grade separations and impacts to existing BNSF spurs and through city severance will be issues, this maintains transportation systems in one corridor and minimizes impact of adjacent agricultural land. For these reasons it is considered that this alternative should be evaluated further.
- Elevated through Corcoran, following the BNSF: This will solve issues related to severance and grade crossings but will increase construction complexity and visual impact. It is supported by the City and it is considered that this alternative should be evaluated further.
- In trench through Corcoran, following the BNSF: this has been discounted due to the construction difficulties associated with trenching through an urban area.
- Bypass to the east of Corcoran: This option provides an alternative to potential impacts to the city and is supported by the City and for these reasons it is considered that this alternative should be evaluated further.
- Bypass to an alignment through less developed land on the eastern side of Corcoran: This option provides an alternative to impacts in the city and is supported by the City and for these reasons it is considered that this alternative should be evaluated further.

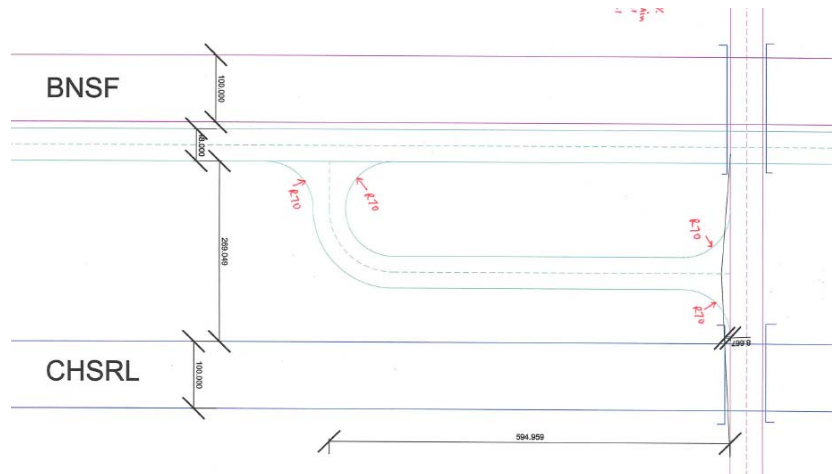
Corcoran to North of Wasco

The key issue to consider over this section is the compromise required between parcel takings and highway works. Between Corcoran and Wasco, Highway 43 runs along the eastern side of the BNSF, diverting away from the railroad in six locations to provide space for rail-connected customers. Over this length, there are numerous level crossings from Highway 43 to the rural roads on the western side of the BNSF. Assuming the HST is construction at-grade, these crossings would need to be replaced with highway bridges and rationalized or combined where appropriate. If the BNSF, HST and Highway 43 are located immediately adjacent to each other, the parcel takings are minimized but the highway bridge crossings become particularly challenging. If the BNSF, HST and Highway 43 are spaced further apart, highway bridge crossings become simpler.

A typical layout is shown in Figure 4. This shows a clearance of 270 feet required between the highway and the HST alignment to accommodate the ramps up to a highway bridge. Should the HST alignment be located between the BNSF and Highway 43, Highway 43 would need to be reconstructed east of its current location and ramps similar to those shown on the figure would still be needed. Placing the HST

alignment on the west side of the BNSF allows Highway 43 to be retained in its current position but may necessitate the construction of two high-speed/BNSF grade separated crossings.

Figure 4
Typical Highway Bridge Layout



It is feasible to allow the HST alignment to pass from the east to the west of BNSF through this section. However, at Hanford and Bakersfield, the HST alignment will be on the eastern side of the BNSF to preserve the Program EIR/EIS Preferred Alignment into Bakersfield and to provide a station to the east of Hanford, and therefore the base case is to locate the HST alignment east of the BNSF through this section.

All options through this area are assumed to be at-grade unless a crossing of the BNSF track is required, in which case the HST alignment would pass over BNSF. A discussion of the three broad options is as follows:

- Western side of the BNSF: This would allow the HST alignment to follow more closely to the BNSF alignment with less inaccessible space, but could increase potential impacts on the Allensworth State Historic Park.
- East side of the BNSF and State Route 43: This minimizes potential impacts to the Allensworth State Historic Park, but could increase potential impacts on the Allensworth Ecological Reserve. It would also require separation from the State Route 43 as described above.
- East side of the BNSF and west of State Route 43: This would require relocation of the State Route 43 but would reduce the width of the transportation corridor. Moving of the State Route 43 could potentially impact the Allensworth Ecological Reserve.

At this stage it is considered that all of these options should be evaluated further.

North of Wasco to North of Bakersfield (Hageman Road)

Similar to Corcoran, Wasco has many rail-connected customers within the city limits, not least of which is the Amtrak Station from where Photo 2 was taken. All alternatives through Wasco are therefore likely to require significant alterations to the existing BNSF infrastructure.

Photo 2
Wasco



Shafter has fewer rail-connected businesses within the city limits compared to Wasco, as shown on Photo 3, and a relatively wide right-of-way (approximately 90 feet) however some land acquisition would be required to allow an at-grade, parallel alignment. There are three level crossings in Shafter with a significant number of highway frontage properties immediately adjacent to the crossings. Any through city option will therefore require significant construction works and land purchase if only for highway works or temporary railroad diversions.

Photo 3
Shafter



Alternatives were considered for each of these cities. There are also combinations of options that could be adopted such as east of Wasco followed by at-grade through Shafter etc. It should be noted that the geometric constraints do not lend themselves to diverting to the west of one city and east of the other.

Discussions with the cities of Wasco and Shafter indicated that the City of Wasco supported an eastern bypass consistent with the Program EIR/EIS, but as a result of potential development in the area further

study of the appropriate location was required. The City of Shafter did not support the elevated option proposed in the Program EIR/EIS and stated that a bypass solution was preferred.

All bypass routes have been proposed as at-grade solutions in order to minimize cost, visual impact and to contain noise emissions.

The Initial Screening of these local options has filtered the alternatives as follows:

- At-grade through Wasco and Shafter, following the BNSF: This is considered the base case, and while grade separations and impacts to existing BNSF spurs and severance through the cities will be issues, this maintains transportation systems in one corridor and minimizes impact of adjacent agricultural land. For these reasons it is considered that this alternative should be evaluated further.
- Elevated through Wasco and Shafter, following the BNSF: This will solve issues related to severance and grade crossings but will increase construction complexity and visual impact. It is considered that this alternative should be evaluated further.
- Elevated BNSF lines through Wasco and Shafter: This is not considered an alternative that should be evaluated further due to stringent vertical grade criteria for freight rail and the need to provide an Amtrak station in Wasco.
- In trench through Wasco and Shafter, following the BNSF: This has been discounted due to the construction difficulties associated with trenching through an urban area.
- BNSF in trench through Wasco and Shafter, following the BNSF corridor: This has been discounted due to the construction difficulties associated with trenching through an urban area, stringent vertical grade criteria for freight rail and the need to provide an Amtrak station in Wasco.
- Bypass to the west of Wasco and Shafter: This is longer than an eastern bypass. Increasing journey time and may constrain future development of Wasco to the west. The alignment also impacts more agricultural land than the eastern bypass. For these reasons it is considered that this alternative should not be evaluated further.
- Bypass to the east of Wasco and Shafter: This option provides an alternative to impacts in the cities and is supported by both cities and for these reasons it is considered that this alternative should be evaluated further.

Pros

- Relatively low engineering complexity because a majority of the alignment is at-grade, less complex than elevated or below grade construction.
- This alternative is ranked “Low” in terms of potential impacts on incorporated communities and census-designated areas.
- This alternative is ranked “Low” in terms of potential impacts on parcels planned for future development.
- This alternative is ranked “Low” in terms of potential impacts on residential and commercial parcels.
- This alternative is ranked “Low” when compared to several other alternatives in terms of potential impacts on sensitive receptors.
- Avoids Laton and associated impacts.
- Options such as bypasses and elevated solutions exist to mitigate impacts through the cities of Corcoran, Wasco, and Shafter.
- This alternative services one of the better station locations considered in the *Visalia-Tulare-Hanford Station Feasibility Study* with good potential connections to existing transportation networks and highest residences and jobs.

Cons

- This alternative would be located alongside Pixley National Wildlife Reserve and Allensworth State Ecological Reserve.
- This alternative could have potential impacts on Section 4(f) properties located within ¼-mile of the alignment which are primarily located within the cities of Corcoran and Shafter and within Allensworth Historic Park. The alignment is located adjacent to a public park in the City of Corcoran; within the Allensworth Historic District, a Section 4(f) property; and within ¼-mile of three other historic properties in this locality. This alignment is also located adjacent to Mannel Park north of the City of Shafter, and could potentially affect one other historic property in this locality.
- This alternative is ranked “High” with respect to potential impacts on the 100-year floodplain.
- The alignment follows the BNSF tracks and as such will result in the severing of spurs currently serving BNSF customers.
- Trench options through Corcoran, Wasco, and Shafter would introduce significant construction complexity.
- The western bypass of Wasco and Shafter impact significant extents of agricultural land and potential development areas of Wasco, while increasing route length and travel time and as such do not provide benefits over other bypass options.
- The alternative is generally not supported by local and regional plans and policies and jurisdictions although the City of Visalia and Tulare County support this alternative if an alignment closer to the City of Visalia is found to be infeasible.

Major concerns

- Potential impacts on Section 4(f) properties would require further analysis and investigation. However, as this alternative uses the existing BNSF corridor it is anticipated that such impacts may not be substantial and could potentially be avoided or mitigated.
- Potential direct and indirect impacts on Pixley National Wildlife Refuge and Allensworth State Ecological Reserve should be evaluated further.
- Construction impacts through the cities of Corcoran, Wasco, and Shafter could be significant and require further studies.

Conclusion

At this stage of engineering and environmental screening, no potential impacts on environmental resources have been identified that would result in this alternative being considered infeasible. This alternative should therefore be evaluated further, however unless further constraints become evident, trenches and a western bypass of Wasco and Shafter will not be part of this evaluation.

4.2.3 Visalia-Tulare-Hanford Station Alternatives

4.2.3.1 R4/B1 UPRR – Fresno-South Below Grade

Pros

- This alternative is ranked “Low” when compared to other alternatives in terms of length of the alignment that would be located within agricultural land.
- This alternative is ranked “Low” in terms of potential impacts on residential and industrial parcels.
- This alternative is ranked “Low” in terms of potential wetland impacts.
- This alternative is ranked “Low” in terms of potential vernal pool impacts.
- This alternative is ranked “Low” in terms of potential impacts on the 500-year floodplain.

Cons

- The Visalia options study stated that the only environmentally acceptable way to pass through Fowler, Selma, and Kingsburg was in trench. Providing trench through these urban areas could potentially be disruptive to highways, railroad operations, buried utilities, irrigation and drainage channels.
- The alternative follows close to the UPRR corridor. UPRR is not supportive of HST in or close to UPRR ROW or facilities.
- At Tulare, the station is proposed on the site of a large UPRR sidings yard. It is anticipated that a viaduct will be required to avoid extensive siding severances in this area.
- The alignment follows the UPRR south of Delano where Highway 99 crosses from the eastern to the western side of the UPRR. The HST would need to be located either between the 99 and the UPRR through this section, eventually crossing to the west through a high-skew bridge, or run alongside the western side of Highway 99, with the highway located between the HST and UPRR lines. Either way, this situation increases the complexity of construction alongside the UPRR south of Delano.
- The UPRR has a significant number of rail-connected customers which would be severed by this alternative.
- Grade separating highway crossings with the UPRR and HST in a joint corridor will have a significant impact on the adjacent highway network and hence roadside properties.
- This alternative would be located alongside Pixley National Wildlife Reserve and Allensworth State Ecological Reserve.
- The alignment could have potential impacts on Section 4(f) properties located within ¼-mile of the alignment which are primarily public parks and/or recreational areas located within the cities of Selma, Kingsburg, Tulare and Delano.
- This alternative is ranked “High” with respect to the length of the alignment that traverses incorporated communities and census-designated areas.
- This alternative is ranked “High” with respect to the potential impacts on parcels planned for development.
- This alternative is ranked “High” with respect to potential impacts on commercial parcels.
- This alternative is ranked “High” with respect to potential impacts on the 100-year floodplain.
- This alternative is ranked “High” when compared to several other alternatives in terms of potential impacts on sensitive receptors.

Major concerns

- Construction complexity and difficulties of avoiding impacts to UPRR are significant concerns.
- Potential direct and indirect impacts on Pixley National Wildlife Refuge and Allensworth State Ecological Reserve should be evaluated further.
- Potential impacts on Section 4(f) properties would require further analysis and investigation. However, as this alternative uses the existing UPRR corridor and is proposed to be below-grade in several urban areas, it is anticipated that such impacts may not be substantial and could potentially be avoided or mitigated.

Conclusion

While at this stage of environmental screening, no potential impacts on environmental resources have been identified that would result in this alternative being considered infeasible, construction complexity is considered to be significantly higher than other alternatives as a result of the need for trench construction through Fowler, Selma and Kingsburg. In addition, lack of cooperation from UPRR will make this alternative difficult to construct. As such this alternative should not be evaluated further.

4.2.3.2 R5/B2 UPRR – Fresno-South Bypass

Pros

- This alternative provides a bypass to the cities of Kingsburg, Selma and Fowler dramatically reducing the construction complexity when compared with Alternative R5/B2.
- This alternative is ranked “Low” when compared to other alternatives in terms of length of the alignment that would be located within agricultural land.
- This alternative is ranked “Low” in terms of potential impacts on residential parcels.
- This alternative is ranked “Low” in terms of potential wetland impacts.
- This alternative is ranked “Low” in terms of potential vernal pool impacts.
- This alternative is ranked “Low” in terms of potential impacts on the 500-year floodplain.

Cons

- Despite the bypass, this alternative is co-located with both a state highway and the UPRR freight alignment for 55% of its length and travels through a significant amount of developed land particularly through the cities of Tulare, Tipton, Pixley, Earlimart, Delano and MacFarland. This would result in significant construction complexity.
- The alternative follows close to the UPRR corridor. UPRR are not supportive of HST in or close to UPRR ROW or facilities.
- This alternative is ranked “High” when compared to other alternatives in terms of major waterway crossings that would be required.
- This alternative could have potential impacts on Section 4(f) properties located within ¼-mile of the alignment; primarily public parks and/or recreational areas located within the cities of Tulare and Delano.
- This alternative is ranked “High” with respect to the length of the alignment that traverses low-income census-designated areas.
- This alternative is ranked “High” with respect to potential impacts on commercial parcels and parcels planned for future development.
- This alternative is ranked “High” with respect to potential impacts on the 100-year floodplain.
- The alternative is generally not supported by local and regional plans and policies and jurisdictions.

Major concerns

- Construction complexity and difficulties of avoiding impacts to UPRR are significant concerns.
- Potential impacts on Section 4(f) properties would require further analysis and investigation. However, as this alternative uses the existing UPRR corridor, bypasses the cities of Fowler, Selma and Kingsburg and is proposed to be below-grade in several urban areas it is anticipated that such impacts may not be substantial and could potentially be avoided or mitigated.

Conclusion

While this alternative follows the UPRR corridor, an alternative rejected in the Program EIR/EIS, it services several potential station sites in the Visalia/Tulare area, and has fewer construction impacts when compared with alternative R4/B1, as a result of the bypass of Fowler, Selma and Kingsburg. While the bypass has more impact on agricultural land, it is considered that this alternative rather than R4/B1 should be subject to further evaluation. In addition, at this stage of environmental screening, no potential impacts on environmental resources have been identified that would result in this alternative being considered infeasible. Scoping comments indicated a desire for an elevated alternative and an alternative to the east of the State Route 99. These alternatives would form part of the next level of study.

4.2.3.3 R6/D1 UPRR to BNSF (198 Station) - Fresno-South Below Grade

Pros

- This alternative is ranked “Low” in terms of major waterway crossings.
- This alternative is ranked “Low” in terms of potential impacts on commercial and residential parcels.
- This alternative is ranked “Low” in terms of potential wetland impacts.
- This alternative is ranked “Low” in terms of potential impacts on the 500-year floodplain.

Cons

- The Visalia options study stated that the only environmentally acceptable way to pass through Fowler, Selma, and Kingsburg was through the use of trenching. Providing trench through these urban areas will substantially disrupt highways, railroad operations, sub-surface and aboveground utilities, irrigation and drainage channels.
- The alternative follows close to the UPRR corridor. UPRR is not supportive of HST in or close to UPRR ROW or facilities.
- The UPRR has a significant number of rail-connected customers whose access would be severed by this alignment.
- Grade separating highway crossings with the UPRR and HST in a joint corridor will have a significant impact on the adjacent highway network and hence roadside properties.
- The alignment is ranked “High” in terms of potential impacts on Section 4(f) properties located within ¼-mile of the alignment which are primarily public parks and/or recreational areas located within the cities of Selma, Kingsburg, Allensworth and north of the city of Shafter. This alignment would also be located within Allensworth Historic District, a Section 4(f) property, and within ¼-mile of three other historic properties in this locality. This alignment is also located adjacent to Mannel Park and Richland Park north of the city of Shafter, and could potentially affect one other historic property in this locality.
- This alternative is ranked “High” in terms of potential impacts on parcels planned for future development.
- This alternative is ranked “High” with respect to potential impacts on the 100-year floodplain.
- .
- This alternative is located adjacent to Pixley National Wildlife Refuge and Allensworth Ecological Reserve.
- The station is currently shown between a series of back to back curves. Some design development is required to ensure that these do not affect the speed, maintainability or safety of the HST through the four-track station area.
- The alternative is generally not supported by local and regional plans and policies and jurisdictions.

Major concerns

- Construction complexity and difficulties of avoiding impacts to UPRR are significant concerns.
- Potential impacts on Section 4(f) properties would require further analysis and investigation. However, as this alternative uses the existing UPRR corridor for much of its length and is proposed to be below-grade in several urban areas, it is anticipated that such impacts may not be substantial and could potentially be avoided or mitigated.
- Potential direct and indirect impacts on Pixley National Wildlife Refuge and Allensworth State Ecological Reserve should be evaluated further.

Conclusion

While at this stage of environmental screening, no potential impacts on environmental resources have been identified that would result in this alternative being considered infeasible, construction complexity is

considered to be significantly higher than other alternatives as a result of the need for trench construction through Fowler, Selma and Kingsburg. In addition, lack of cooperation from UPRR will make this alternative difficult to construct. As such this alternative should not be evaluated further.

4.2.3.4 R7/D2 UPRR to BNSF – Fresno-South Bypass

Pros

- This alternative provides a bypass to the cities of Fowler, Selma, and Kingsburg reducing the construction complexity when compared with Alternative R5/D1.
- This alternative is ranked “Low” with respect to the length of the alignment that traverses incorporated communities and census-designated areas.
- This alternative is ranked “Low” in terms of potential impacts on residential and commercial parcels.
- This alternative is ranked “Low” in terms of potential wetland impacts.
- This alternative is ranked “Low” in terms of potential impacts on the 500-year floodplain.
- This alternative is ranked “Low” when compared to potential impacts on sensitive receptors.
- The alternative is supported by some local and regional plans and policies and jurisdictions, including the cities of Hanford and Visalia and the counties of Kings, Kern and Tulare.

Cons

- While providing a bypass further south, the alignment follows the UPRR/State Route 99/Golden State Parkway Boulevard from Fresno through Calwa and Malaga. Construction complexity and interface with UPRR will be of concern in this section.
- This alternative is ranked “High” in terms of the length of the alignment that is located within agricultural land.
- This alternative could have potential impacts on Section 4(f) properties located within ¼-mile of the alignment which are primarily public parks and/or recreational areas located within Allensworth and north of Shafter. This alignment would also be located within Allensworth Historic District, a Section 4(f) property, and within ¼-mile of three other historic properties in this locality. This alignment is also located adjacent to Mannel Park and Richland Park, both north of the City of Shafter, and could potentially affect one other historic property in this locality.
- This alternative is ranked “High” in terms of potential impacts on industrial parcels.
- This alternative is ranked “High” in terms of potential impacts on parcels planned for future development.
- This alternative is ranked “High” with respect to potential impacts on the 100-year floodplain.
- A significant length of the alignment crosses undeveloped land which is contrary to the desire to combine transportation corridors.
- This alignment is located adjacent to Pixley National Wildlife Refuge and Allensworth Ecological Reserve.
- This alignment is the second longest alignment with consequent increase in journey time; 3 miles longer than the program level alignment route representing 0.9 minutes increased journey time at full operating speed.
- The station is currently shown between a series of back to back curves. Some design development is required to ensure that these do not affect the speed, maintainability or safety of the HST through the four-track station area.

Major concerns

- Potential impacts on Section 4(f) properties would require further analysis and investigation. However, as this alternative uses the existing UPRR corridor for much of its length and is proposed to be below-grade in and/or bypass several urban areas it is anticipated that such impacts may not be substantial and could potentially be avoided or mitigated.

- Potential direct and indirect impacts on Pixley National Wildlife Refuge and Allensworth State Ecological Reserve should be evaluated further.
- Construction complexity north of Fowler and interface with UPRR is of concern.
- Construction impacts through the cities of Wasco and Shafter could be significant and require further studies.

Conclusion

While this alternative follows the UPRR corridor, an alternative rejected in the Program EIR/EIS, it services several potential station sites in the Visalia/Tulare area, and has less construction impact when compared with alternative R6/D1, as a result of the bypass of Fowler, Selma and Kingsburg. While the bypass has more impact on agricultural land, it is considered that this alternative rather than R6/D1 should be subject to further evaluation. In addition, at this stage of environmental screening, no potential impacts on environmental resources have been identified that would result in this alternative being considered infeasible. Scoping comments indicated a desire for an elevated alternative and an alternative to the east of the State Route 99. These alternatives would form part of the next level of study.

4.2.3.5 R8/E1 UPRR to BNSF – Fresno-South Below Grade

Pros

- This alternative is ranked “Low” with respect to the length of the alignment that traverses agricultural land.
- This alternative is ranked “Low” in terms of potential impacts on commercial parcels.
- This alternative is ranked “Low” in terms of potential impacts on residential parcels.
- This alternative is ranked “Low” in terms of potential wetland impacts.
- The alternative is supported by some local and regional plans and policies and jurisdictions, including the cities of Hanford, Visalia and the counties of Kern, Kings and Tulare.

Cons

- The Visalia options study stated that the only environmentally acceptable way to pass through Fowler, Selma and Kingsburg was in trench. Providing trench through these urban areas will be hugely disruptive to highways, railroad operations, buried utilities, irrigation and drainage channels.
- The alternative follows close to the UPRR corridor from Fresno to south of Pixley. UPRR are not supportive of HST in or close to UPRR ROW or facilities.
- The UPRR has a significant number of rail-connected customers whose access would be severed by this alignment.
- Grade separating highway crossings with the UPRR and HST in a joint corridor will have a significant impact on the adjacent highway network and hence roadside properties.
- This alternative is ranked “High” in terms of the number of waterway crossings that would be required with this alternative.
- This alternative could have potential impacts on Section 4(f) properties located within ¼-mile of the alignment which are primarily public parks and/or recreational areas located within the cities of Selma, Kingsburg, Tulare, and north of the City of Shafter. This alignment is also located adjacent to Mannel Park and Richland Park, both north of the City of Shafter, and could potentially affect one other historic property in this locality.
- This alternative is ranked “High” with respect to the length of the alignment that traverses incorporated communities and census-designated areas.
- This alternative is ranked “High” with respect to the length of the alignment that could affect low-income census tracts.
- This alternative is ranked “High” in terms of potential impacts on parcels planned for future development.

- This alternative is ranked “High” in terms of potential vernal pool impacts.
- This alternative is ranked “High” with respect to potential impacts on threatened and endangered species.
- This alternative is ranked “High” with respect to potential impacts on the 100-year floodplain.
- This alignment is ranked “High” in terms of potential impacts on sensitive receptors.
- This alignment bisects Allensworth State Ecological Reserve.

Major concerns

- Construction complexity and difficulties of avoiding impacts to UPRR are significant concerns.
- Potential impacts on Section 4(f) properties would require further analysis and investigation. However, as this alternative uses the existing UPRR corridor for much of its length and is proposed to be below-grade in and/or bypass several urban areas it is anticipated that such impacts may not be substantial and could potentially be avoided or mitigated.
- This alternative bisects a series of major vernal pool complexes located in the area between the cities of Alpaugh to the west, Earlimart to the East and Delano to the southeast. The extent of the complexes indicates that it would not likely be possible to realign the alternative to avoid these resources.
- Direct impacts on Allensworth State Ecological Reserve.

Conclusion

Potential impacts on vernal pool complexes and Allensworth State Ecological Reserve associated with this alternative indicate that it could result in significant adverse environmental impacts which would require substantial mitigation. Construction complexity as a result of the need for trench construction through Fowler, Selma and Kingsburg is considered to be significantly higher than other alternatives. In addition lack of cooperation from UPRR will make this alternative difficult to construct. As such this alternative should not be evaluated further.

4.2.3.6 R9/E2 UPRR to BNSF (99 Station) – Fresno- South Bypass

Pros

- This alternative provides a bypass to the cities of Fowler, Selma, and Kingsburg reducing the construction complexity when compared with Alternative R8/E1.
- This alternative is ranked “Low” in terms of waterway crossings that would be required.
- This alternative is ranked “Low” in terms of potential impacts on commercial and residential parcels.
- This alternative is ranked “Low” in terms of potential wetland impacts.
- This alternative is ranked “Low” in terms of potential impacts on the 500-year floodplain.
- .
- The alternative is supported by some local and regional plans and policies and jurisdictions, including the cities of Hanford and Visalia and the counties of Kings, Tulare and Kern.

Cons

- While providing a bypass further south, the alignment follows the UPRR/State Route 99/Golden State Parkway Boulevard from Fresno through Calwa and Malaga. Construction complexity and interface with UPRR will be of concern in this section.
- This alternative could have potential impacts on Section 4(f) properties located within ¼-mile of the alignment which are primarily public parks and/or recreational areas located within the City of Tulare, and north of the City of Shafter. This alignment is also located adjacent to Mannel Park and Richland Park, both north of the City of Shafter, and could potentially affect one other historic property in this locality.
- .

- This alternative is ranked “High” in terms of potential impacts on industrial parcels.
- This alternative is ranked “High” in terms of potential impacts on parcels planned for future development.
- This alternative is ranked “High” in terms of potential vernal pool impacts.
- This alternative is ranked “High” with respect to potential impacts on threatened and endangered species.
- This alignment bisects Allensworth State Ecological Reserve.

Major concerns

- Potential impacts on Section 4(f) properties would require further analysis and investigation. However, as this alternative uses the existing UPRR corridor for much of its length and is proposed to be below-grade in and/or bypass several urban areas it is anticipated that such impacts may not be substantial and could potentially be avoided or mitigated.
- This alternative bisects Allensworth State Ecological Reserve and a series of major vernal pool complexes located in the area between the cities of Alpaugh to the west, Earlimart to the East and Delano to the southeast. The extent of the complexes indicates that it would not likely be possible to realign the alternative to avoid these resources.

Conclusion

Potential impacts on vernal pool complexes and Allensworth State Ecological Reserve associated with this alternative indicate that it could result in significant adverse environmental impacts which would require substantial mitigation. For these reasons, it is suggested that this alternative not be evaluated further.

4.2.4 Straight Alignments Alternatives

4.2.4.1 R15/3B BNSF – South of Corcoran West

Pros

- This represents one of the shortest alignments, some 2.6 miles shorter than the Program EIR/EIS Preferred Alignment, and consequently a comparatively shorter journey time.
- The alignment does not pass through cities and is not adjacent to existing rail corridors and therefore severance of spurs, grade separations and impacts to the existing road network are greatly reduced.
- The alignment is elevated over much of its route and consequently the land use, severance, grade crossing and wildlife migration issues are significantly reduced over at-grade alignments.
- An elevated solution is preferred by the Department of Fish and Game.
- This alignment services one of the better station locations considered in the *Visalia-Tulare-Hanford Station Feasibility Study* with good potential connections to existing transportation networks and highest residences and jobs.
- There are no Section 4(f) properties affected by this alternative.
- This alternative is ranked “Low” with respect to the length of the alignment that traverses incorporated communities and census-designated areas.
- This alternative is ranked “Low” with respect to the length of the alignment that could affect low-income census tracts.
- This alternative is ranked “Low” in terms of potential impacts on residential, industrial and commercial parcels.
- This alternative is ranked “Low” in terms of potential vernal pool impacts.
- This alternative is ranked “Low” in terms of potential impacts on threatened and endangered species.
- This alignment is ranked “Low” in terms of potential impacts on sensitive receptors.

Cons

- An elevated alignment is expected to be more costly than an at-grade solution; however this will be partly mitigated by reduced construction impacts and associated works such as utility diversions and grade separations.
- The maintenance costs of a viaduct are expected to be significantly higher than an at-grade solution.
- This alternative is ranked “High” when compared to other alternatives in terms of length of the alignment that would be located within agricultural land.
- This alternative is ranked “High” in terms of potential impacts on parcels planned for future development.
- This alternative is ranked “High” in terms of potential wetland impacts.
- This alternative is ranked “Low” in terms of potential impacts on the 100-year floodplain but high for the 500-year floodplain.
- The alternative is generally not supported by local and regional plans and policies and jurisdictions, although the City of Visalia and Tulare County support this alternative if an alignment closer to the City of Visalia is found to be infeasible.

Major concerns

- Capital costs and maintenance costs are expected to be high for a full length viaduct.

Conclusion

At this stage of engineering and environmental screening, no significant construction issues or potential impacts on environmental resources have been identified that would result in this alternative being considered infeasible. An elevated straight alternative avoids the need for grade crossing and reduces severance issues, at the expense of high capital and maintenance costs. This alternative should be evaluated further. Combining at grade and viaduct sections should also be reviewed to balance the lower cost of at-grade with the greater utility of an elevated solution.

4.2.4.2 R16/3C BNSF – Straight Alignment Alternatives

Pros

- This alternative is similar to the R15/3B alternative but stays to the east of BNSF alignment avoiding crossings, and has the same benefits.
- This alignment services one of the better station locations considered in the *Visalia-Tulare-Hanford Station Feasibility Study* with good potential connections to existing transportation networks and highest residences and jobs.
- This alternative is ranked “Low” with respect to the length of the alignment that traverses incorporated communities and census-designated areas.
- This alternative is ranked “Low” with respect to the length of the alignment that could affect low-income census tracts.
- This alternative is ranked “Low” in terms of potential impacts on residential and commercial parcels.
- This alternative is ranked “Low” in terms of potential impacts on the 500 and 100-year floodplains.
- This alternative is ranked “Low” in terms of potential impacts on threatened and endangered species.
- This alignment is ranked “Low” when compared to several other alternatives in terms of potential impacts on sensitive receptors.

Cons

- An elevated alignment is expected to be more costly than an at-grade solution; however this will be mitigated by reduced construction impacts and associated works such as utility diversions and grade separations.
- This alternative could have potential impacts on Section 4(f) properties located within ¼-mile of the alignment.
- This alternative is ranked “High” when compared to other alternatives in terms of length of the alignment that would be located within agricultural land.
- This alternative is ranked “ High” in terms of potential impacts on parcels planned for future development.
- This alternative is ranked “High” in terms of potential wetland impacts.
- This alternative is ranked “High” in terms of potential vernal pool impacts.
- This alternative bisects Pixley National Wildlife Reserve and part of Allensworth Ecological Reserve

Major concerns

- This alternative bisects Pixley National Wildlife Refuge and Allensworth State Ecological Reserve. The extent of these resources indicate that they could not be avoided even with realignment of the alternatives.
- The alternative is generally not supported by local and regional plans and policies and jurisdictions, although the City of Visalia and Tulare County support this alternative if an alignment closer to the City of Visalia is found to be infeasible. Kern County also supports this alignment.

Conclusion

Potential impacts on Pixley National Wildlife Reserve and Allensworth State Ecological Reserve associated with this alternative indicate that it could result in significant adverse environmental impacts which may not be possible to mitigate even with an elevated solution. For this reason, it is suggested that this alternative not be evaluated further.

4.3 ALTERNATIVE SCREENING FINDINGS – STATION ALTERNATIVES

4.3.1 Station Discussion

Five potential station locations have been identified. These five stations are analyzed below, with much of the background information gleaned from the *Visalia-Tulare-Hanford Station Feasibility Study*. It is noted that the station analysis at this time may not be as extensive as that for the alignments.

The five potential station locations have been assessed against how well they mesh with the existing road and traffic network and with transit services. This assessment is presented in Table 5.

**Table 5
Station Comparison**

Objective	Criteria	Metric	198 West	198 East	99 North	99 Center	99 South
Conflicts With Existing Conditions	Connectivity	How well does the station site mesh with the existing road and traffic network?	Well (at crossroads of major EW/NS freeways)	Average (along NS freeway, 1 mile from EW)	Average (along EW freeway, 1 mile from NS)	Average (along NS freeway, 1 mile from EW)	Poor (no close EW connection to Hanford)
	Connectivity	How well does the station site mesh with the existing transit service network?	Average (1 Kings County Transit route to Visalia passes through)	Average (Visalia Transit routes operate on 198 can divert)	Well (2 Visalia Transit routes currently serve site)	Average (1 Visalia Transit route serves area)	Well (directly served by Visalia & Tulare Transit)

198 West: Station to the east of Hanford in the vicinity of the State Route 43/State Route 198 junction

This site location is within the jurisdictions of the City of Hanford and Kings County. Within the State Route 198 corridor, the proposed location could be centered on one of two areas: (i) the intersection of State Route 198 and State Route 43 (the Central Valley Highway); or (ii) the intersection of State Route 43 (the Central Valley Highway) and the Cross-Valley Rail Line. Highway access north-south and east-west is close by and convenient for both potential station locations. The predominant existing land use is agricultural (deemed farmland of local importance), with some clustered residential uses south of the State Route 198 and State Route 43 junction. This station would not generate major impacts on nearby communities.

Within a 20-mile radial catchment zone, this station location has the highest number of existing and projected 2030 residents/jobs of all possible stations.

Station Location	Existing Population	Projected 2030 Population	Existing Jobs	Projected 2030 Jobs
198-West	424,700	683,300	151,802	237,054

In conclusion, this station location has little impact on nearby communities and farmland, while having good freeway access in the north-south direction (State Route 43) and in the east-west direction (State Route 198). It is the closest site to Hanford and has the largest projected population and number of jobs within its catchment zone. Negatives for this station location relate to its remoteness from existing/planned urbanized areas which reduces transit-oriented development potential and the potential for integrating several transit/transportation modes at one location close to urban areas.

198 East: Station on the State Route 198 to west of State Route 99

The 198 East Station is about 5.0 miles west of Visalia proper, with convenient east-west highway access from State Route 198 and north-south access from State Route 99. This site lies in unincorporated Tulare

County, with the predominant existing and proposed land use being valley agricultural (deemed prime farmland). This area also lies outside of the City of Visalia's Urban Area Boundary. This station would not generate major impacts on nearby communities as it lies outside of urbanized areas of Visalia.

Within a 20-mile radial catchment zone, this station location has one of the lowest totals for existing and projected residents and jobs of all stations.

Station Location	Existing Population	Projected 2030 Population	Existing Jobs	Projected 2030 Jobs
198-East	389,700	628,500	143,323	227,516

In conclusion, this station location has little impact on nearby communities, although the land it sits on is deemed as prime farmland and is outside the City of Visalia's Urban Area Boundary, meaning it is unlikely the city would extend into this area. It has good freeway connections to Visalia to the west, to Tulare to the south, and Hanford to the west. Its location near the Visalia Municipal Airport is an added advantage. Negatives for this station location relate to its remoteness from existing/planned urbanized areas which reduces transit-oriented development potential and the potential to integrate several transit/transportation modes at one location close to urban areas.

99 North: Station on State Route 99 to north of Visalia

The 99 North Station is located about 4.0 miles northwest of Visalia proper. It is close to State Route 99 for convenient north-south access and about 1.0 miles from the east-west State Route 198, while being adjacent to the Cross-Valley Rail Line, at the point where that rail line joins the UPRR corridor. This station location falls within unincorporated Tulare County, in an area designated for industrial and commercial uses. At present, the predominant existing land use is light industrial to the northwest and residential to the south. The northern tip of this proposed area sits on designated prime farmland. Communities would be impacted by this station location.

Within a 20-mile radial catchment zone, this station location has the lowest totals for existing and projected residents and jobs of all stations.

Station Location	Existing Population	Projected 2030 Population	Existing Jobs	Projected 2030 Jobs
99-North	343,200	555,400	127,955	203,442

In conclusion, this station location has good access to nearby east-west and north-south freeways and is located closer to Visalia proper than the other station locations. This being said, the location would impact residential communities significantly, while also having the lowest population and number of jobs within its catchment zone. The presence of industrial uses to the northwest and future development of the rail junction may prove problematic. Transit-oriented development potential is limited at this station due to existing land uses. Transit connections to the station would likewise generate additional disruption to residents.

99 Central: Station on State Route 99 to west of Visalia

The station location is on a site owned by the City of Visalia, which currently operates the Visalia Wastewater Treatment Plant on Avenue 288. Agricultural orchards surround this plant on three sides, which is deemed as prime farmland. The wastewater treatment plant would be impacted by this station location.

Within a 20-mile radial catchment zone, this station location has one of the lowest totals for existing and projected residents and jobs of all stations.

Station Location	Existing Population	Projected 2030 Population	Existing Jobs	Projected 2030 Jobs
99-Central	389,722	628,499	143,323	227,516

In conclusion, this station location has good access to the adjacent north-south State Route 99, while being close to the east-west State Route 198. However, it is not close to the Cross-Valley Rail Line. Furthermore, the station location is located far from the city center, and has impacts on the potential for transit-oriented development and the possibility of integrating various transit modes at one location. The existing wastewater plant is also a major physical constraint that must be built around. Malodorous smells from the adjacent wastewater plant may also create an unpleasant waiting environment for passengers. This station location also has one of the lowest catchment populations and jobs of the stations.

99 South: Station on State Route 99 to north of Tulare

The closest major east-west connector (State Route 198) is 7.0 miles north of this location, therefore linkages to Hanford are quite poor for this station location, while the distance to Visalia is also relatively far at about 7.0 miles. Existing land use is residential, with some light industrial which would be impacted significantly by any station at this site. In the northwest quadrant of the J Street and Prosperity Avenue junction, some open agricultural space exists.

Within a 20-mile radial catchment zone, this station location has one of the highest totals for existing and projected residents and jobs of all stations.

Station Location	Existing Population	Projected 2030 Population	Existing Jobs	Projected 2030 Jobs
99-South	422,300	680,500	18,117	232,614

In conclusion, this station location is in close proximity to Tulare and has relatively good access to the north-south State Route 99. Its catchment zone has the second largest project populations and jobs of all stations. Open space exists in this site for possible transit-oriented development at the station. The 2030 General Plan proposes restricting uses to those consistent with agricultural and open space designations – this means that the likelihood of new development encroaching on the station site is low in the near term. This being said, surrounding areas are residential in nature which will be greatly impacted by a station. The site is not adjacent to the Cross-Valley Rail Line. Furthermore, the station's remote location from Visalia and from Hanford, particularly the east-west State Route 198 is problematic.

4.3.2 Station Conclusion

The five station locations serve the area in different ways. Station locations 198 West and 99 North appear to provide the best integration with the existing traffic and transit networks and 198 West has the highest populations and jobs in its catchment zone. However, none of the sites have potential issues that would result in the sites being considered infeasible and as such all should be carried forward for further study in combination with the alignment alternatives that serve them.

4.4 SUMMARY

On the basis of the Initial Screening the following conclusions are made:

- A station is to be provided to serve Visalia, Tulare and Hanford. Alternatives should be carried forward to serve this.
- Urban trench construction is considered to be of high complexity and it is recommended that this is avoided.
- Alternatives that follow the UPRR corridor are considered complex as a result of UPRR's lack of cooperation with the project.
- Elevated straight alignment alternatives offer benefits in terms of less impact to cities and to the existing road network, at the expense of high construction and maintenance costs.
- Alignments that directly bisect important environmental resources such as potential Section 4(f) properties, vernal pool complexes, the Allensworth State Ecological Reserve or the Pixley National Wildlife Reserve are not recommended for further consideration where the evaluation indicates it would be extremely difficult to avoid adverse impacts on these resources.

As a result of the screening it is suggested that the following alternatives be eliminated from further consideration:

- R1/LPA Program EIR/EIS Preferred Alignment – BNSF - Hanford West Bypass
- R4/B1 UPRR – Fresno-South Below Grade
- R6/D1 UPRR to BNSF (198 Station) – Fresno-South Below Grade
- R8/E1 UPRR to BNSF (99 Station) – Fresno-South Below Grade
- R9/E2 UPRR to BNSF (99 Station) – Fresno-South Bypass
- R16/3C BNSF – Straight Alignment Alternative

It is suggested that the following alternatives be refined and evaluated in the Preliminary Alternatives Analysis:

- R3/A1 BNSF – Hanford East Bypass
- R5/B2 UPRR – Fresno-South Bypass
- R7/D2 UPRR to BNSF (198 Station) – Fresno-South Bypass
- R15/3B BNSF – South of Corcoran West

It is further suggested that the following options be considered to mitigate local impacts for the Hanford East Bypass alternative:

- North of Hanford – Options for rejoining BNSF north of Hanford station
- Corcoran – Eastern bypasses and elevated solutions
- Adjacent to BNSF between Wasco and Corcoran – East and west of BNSF tracks in and outside of BNSF ROW.
- Shafter and Wasco – Eastern bypasses and elevated solutions

Table 6 summarizes the outcome of the analysis by alternative.

**Table 6 – Merced to Bakersfield (Fresno-Bakersfield Study)
Summary of Initial Screening**

Alternative Group	Ref. No.	Alt. No.	Alternative/ Option Description	Origin	Scope	Predominant Profile	Station Location	Conclusions
Program EIR/EIS Preferred Alignment	R-1	LPA	BNSF - Hanford West Bypass	Program EIR/EIS	Full Alignment Alternative	At Grade	None	As this alternative has been designed to older criteria and does not provide a station location in the Visalia-Tulare-Hanford area, it is suggested that this alternative be eliminated from further consideration.
	R-3	A-1	BNSF - Hanford East Bypass	Modified Program EIR/EIS Preferred Alignment from V-T-H Station Feasibility Study	Full Alignment Alternative	At Grade	198 West	This alternative is consistent with the Program EIR/EIS Preferred Alignment and provides a station in the Visalia-Tulare-Hanford area. It is suggested that this alternative be refined and evaluated in the Preliminary Alternatives Analysis.
Visalia-Tulare-Hanford (V-T-H) Station Feasibility Study	R-4	B-1	UPRR – Fresno-South Below Grade	V-T-H Station Feasibility Study	Full Alignment Alternative	Below grade, at-grade	99 North or 99 Center or 99 South	An alignment similar to this which follows the UPRR/State Route 99 alignment was considered in the Program and eliminated. It would likely result in significant impacts particularly to the communities of Fowler, Selma and Kingsburg. It is therefore suggested that this alternative be eliminated from further consideration.
	R-5	B-2	UPRR – Fresno-South Bypass	V-T-H Station Feasibility Study	Full Alignment Alternative	At-grade	99 North or 99 Center or 99 South	This alternative avoids much of the impact in the Fowler/Selma/Kingsburg area, and accommodates comments received during the scoping which support an UPRR/State Route 99 alignment. It is therefore suggested that this alternative be refined and evaluated in the Preliminary Alternatives Analysis.
	R-6	D-1	UPRR to BNSF (198 Station) - Fresno-South Below Grade	V-T-H Station Feasibility Study	Full Alignment Alternative	Below grade, at-grade	198 East or 99 Center	This alignment follows the UPRR/State Route 99 alignment through Fowler/Selma/Kingsburg with significant impact. As a result of the screening it is suggested that this alternative be eliminated from further consideration.
	R-7	D-2	UPRR to BNSF (198 Station) - Fresno-South Bypass	V-T-H Station Feasibility Study	Full Alignment Alternative	At-grade	198 East or 99 Center	This alignment avoids much of UPRR/State Route 99 corridor and the resultant impacts and construction complexity. As a result it is suggested that this alternative be refined and evaluated in the Preliminary Alternatives Analysis.

**Table 6 – Merced to Bakersfield (Fresno-Bakersfield Study)
Summary of Initial Screening**

Alternative Group	Ref. No.	Alt. No.	Alternative/ Option Description	Origin	Scope	Predominant Profile	Station Location	Conclusions
Visalia-Tulare-Hanford (V-T-H) Station Feasibility Study (continued)	R-8	E-1	UPRR to BNSF (99 Station) – Fresno-South Below Grade	V-T-H Station Feasibility Study	Full Alignment Alternative	Below grade, at-grade	99 North or 99 Center or 99 South	This alternative follows much of the UPRR/State Route 99 corridor and has potentially significant impacts on the Allensworth Ecological Reserve. As a result it is suggested that this alternative be eliminated from further consideration.
	R-9	E-2	UPRR to BNSF (99 Station)– Fresno-South Bypass	V-T-H Station Feasibility Study	Full Alignment Alternative	At-grade	99 North or 99 Center or 99 South	This alternative has potentially significant impacts on the Allensworth Ecological Reserve. As a result it is suggested that this alternative be eliminated from further consideration.
	R-15	3-B	BNSF - South of Corcoran West	Project team	Full Alignment Alternative	Elevated	198 West	This alignment minimizes impacts on the communities along the route and, where elevated, mitigates issues of severance and grade separation of existing transportation corridors. An elevated alignment is supported by the Department of Fish and Game. It is therefore suggested that this alternative be refined and evaluated in the Preliminary Alternatives Analysis
Developed by Project Team as Refinements of Program EIR/EIS Preferred Alignment	R-16	3-C	BNSF - Straight alignment	Project team	Full Alignment Alternative	Elevated	198 West	This alternative has potentially significant impacts on the Allensworth Ecological Reserve and the Pixley National Wildlife Refuge. As such it is suggested that this alternative be eliminated from further consideration.
	R-34	I-5	I-5 Corridor Fresno to Bakersfield	Public scoping - (City of Hanford)	Full Alignment Alternative	Not specified in comment	Not specified in comment	As this alignment does not meet the Purpose and Need of project to serve downtowns of Fresno and Bakersfield, it is suggested that this alternative be eliminated from further consideration.

**Table 6 – Merced to Bakersfield (Fresno-Bakersfield Study)
Summary of Initial Screening**

Alternative Group	Ref. No.	Alt. No.	Alternative/ Option Description	Origin	Scope	Predominant Profile	Station Location	Conclusions
Suggested in Public Scoping	R-35	State Route 99 Elevated	State Route 99 Corridor Fresno to Bakersfield	Public scoping - (City of Visalia)	Full Alignment Alternative	Elevated	198 East	A State Route 99/UPRR corridor alignment was considered and eliminated during the Program EIR/EIS. As such it is suggested that this alternative be eliminated from further consideration.
	R-36	UPRR/B NSF	UPRR Corridor through Bakersfield, transitioning to BNSF north of Wasco	Public scoping (multiple comments)	Full Alignment Alternative	Not specified in comment	Not specified in comment	As this alignment does not support the preferred Truxton station location in Bakersfield, it is suggested that this alternative be eliminated from further consideration.
	R-38	State Route 99 East	State Route 99 Corridor, east of State Route 99	Public scoping	Full Alignment Alternative	Not specified in comment	Not specified in comment	A State Route 99/UPRR corridor alignment was considered and eliminated during the Program EIR/EIS. As such it is suggested that this alternative be eliminated from further consideration.
	R-44	State Route 99	State Route 99/UPRR Corridor from Fresno to Bakersfield	Public scoping (multiple comments)	Full Alignment Alternative	Not specified in comment	Not specified in comment	A State Route 99/UPRR corridor alignment was considered and eliminated during the Program EIR/EIS. As such it is suggested that this alternative be eliminated from further consideration.
	R-45	Center of Valley	Center of Valley near State Route 99 Corridor	Public scoping	Full Alignment Alternative	Not specified in comment	Not specified in comment	A State Route 99/UPRR corridor alignment was considered and eliminated during the Program EIR/EIS. As such it is suggested that this alternative be eliminated from further consideration.

Appendix A: INITIAL SCREENING ANALYSIS

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Appendix A: Draft Initial Screening Analysis (Fresno-Bakersfield Study)

					Program EIR/EIS Preferred Alternative	Visalia-Tulare-Hanford Station Feasibility Study Alternatives								Refinements of Program EIR/EIS Preferred Alternative Alignments	
Objective	No.	Criteria	Metric	Scoring Guide	R-1	R-3	R-4	R-5	R-6	R-7	R-8	R-9	R-15	R-16	
					LPA	VTH A-1	VTH B-1	VTH B-2	VTH D-1	VTH D-2	VTH E-1	VTH E-2	3B	3C	
Severe Constraints	1a	Engineering complexity	Number of miles of alignment elevated, at grade, and below grade	- High impact - Medium impact - Low impact	5.5 E 91 G 0 T L	4.4 E 84 G 7.3 T H	4.6 E 92 G 0 T L	5.8 E 85 G 7.3 T H	5.9 E 93 G 0 T L	1.8 E 90 G 7.3 T H	5.9 E 95 G 0 T L	6.7 E 90.6 G 0 T L	94.4 E 0 G 0 T M	94.2 E 0 G 0 T M	
	1b	Engineering complexity	Number of major waterways (river and canals) crossed by the alignment	- High impact - Medium impact - Low impact	6 M	7 M	7 M	8 H	5 L	6 M	8 H	5 L	6 M	7 M	
	2	Limiting Speed	Lowest operating speed at any point on the alignment	< 219 mph 220 – 249 mph > 250 mph	250 L	250 L	250 L	250 L	250 L	250 L	250 L	250 L	250 L	250 L	250 L
	3	Railroad right-of-way access	Number of miles of alignment that require shared use of freight railroad rights-of-way	- High impact - Medium impact - Low impact	73 H	79 H	63 H	58 H	44 M	78 H	65 H	68 H	6.8 L	6.8 L	
	4	Public right-of-way access	Number of miles of alignment that require shared use of Caltrans highway rights-of-way	- High impact - Medium impact - Low impact	52	52 H	49 H	43 M	44 M	56 H	42 M	69 H	4.7 L	7.4 L	
	5	Railroad operations	Number of active railroad sidings that will be severed by the alignment	- High impact - Medium impact - Low impact	6 M	10 M	10 M	10 M	7 M	16 H	16 H	10 M	0 L	0 L	
	6	Operational safety	Does the alternative traverse property or features that could endanger safe HST operation?	- Yes - Unable to determine - No	No L	No L	No L	No L	No L	No L	No L	No L	No L	No L	
Conflicts With Existing Conditions	7a	Land use impacts	Is the station located in the cities' designated central business district?	- Yes - Unable to determine - No	No	No	No	No	No	No	No	No	No	No	
	7b		Number of miles of the alignment that traverse agricultural (includes all definition of agricultural land) land	- High impact - Medium impact - Low impact	104 H	96 M	70 L	81 L	93 M	104 H	81 L	93 M	115 H	111 H	
	8	Section 4(f) impacts	Number of 4(f) resources located within ¼ mile of the alignment: (a) parks and recreation areas, (b) wildlife refuges, (c) cultural resources, including historic sites, and (d) wildlife management areas and wild and scenic rivers.	- High impact - Medium impact - Low impact	7 H	6 M	6 H	4 M	7 H	5 M	6 M	4 M	0 L	3 M	
	9a	Community Impacts	Number of miles of alignment that traverse incorporated communities and census-designated places	- High impact - Medium impact - Low impact	17 M	15 L	33 H	23 M	23 M	13 L	30 H	20 M	7 L	7 L	
	9b		Number of census tracts of low-income population 10% above the county established poverty line within ¼ mile of the alignment	- High impact - Medium impact - Low impact	6 M	7 M	10 H	9 H	7 M	6 M	9 H	8 M	4 L	3 L	
	10a	Property impacts	Number of residential parcels traversed by the alignment	- High impact - Medium impact - Low impact	39 H	0 L	6 L	0 L	6 L	0 L	6 L	0 L	0 L	0 L	
	10b		Number of commercial parcels traversed by the alignment	- High impact - Medium impact - Low impact	0 L	1 L	9 H	7 H	2 L	0 L	2 L	0 L	1 L	1 L	
	10c		Number of industrial parcels traversed by the alignment	- High impact - Medium impact - Low impact	23 H	17 M	7 L	19 M	15 M	27 H	15 M	27 H	3 L	3 L	
	11	Connectivity	How well does the station site mesh with the existing road and traffic network?	- Poorly - Average - Well	See report Table 5										
	12		How well does the station site mesh with the existing transit service network?	- Poorly - Average - Well	See report Table 5										
	Approved Future Development in the Study Area	13a	Land use impacts	Number of parcels planned for development traversed by the alignment	- High impact - Medium impact - Low impact	6 H	3 L	6 H	6 H	6 H	6 H	6 H	6 H	6 H	6 H
13b		Number of parcels planned for development impacted by the station footprint		- High impact - Medium impact - Low impact	0	0	0	0	0	0	0	0	0	0	
14		Public and political support	Is the alternative supported by regional/local plans and policies?	- Yes - Unable to determine - No	No	Unable to determine	Unable to determine	No	No	Yes	Yes	Yes	No	No	
Specific Environmental Impacts	15		Acres of wetlands within 1/4 mile of alignment	- High impact - Medium impact - Low impact	359 M	570 M	198 L	187 L	279 L	269 L	268 L	257 L	764 H	761 H	
	16		Acres of vernal pool complexes within 1/4 mile of alignment	- High impact - Medium impact - Low impact	1,561 M	1,738 M	361 L	361 L	1,440 M	1,427 M	1,999 H	1,982 H	887 L	2,517 H	
	17		Number of occurrences of threatened and endangered species within 1/4 mile of alignment	- High impact - Medium impact - Low impact	54 M	50 M	42 M	43 M	47 M	48 M	72 H	72 H	22 L	38 L	
	18		Acres of Floodplains within 1/4 mile of alignment												
	18a	(a) 100-year		- High impact - Medium impact - Low impact	6,354 M	6,602 H	7,784 H	7,411 H	7,747 H	7,309 H	6,828 H	6,330 M	4,243 L	5,359 L	
	18b	(b) 500-year		- High impact - Medium impact - Low impact	1,755 M	1,978 M	1,251 L	1,085 L	1,215 L	1,048 L	1,475 M	1,241 L	2,603 H	985 L	
	18c	(c) Sensitive receptors within 1/4 mile of alignment (churches, cemeteries, hospitals, schools)		- High impact - Medium impact - Low impact	17 L	19 L	59 H	29 M	44 M	14 L	61 H	29 M	0 L	1 L	

Legend:

H, M, L = high, medium, and low impact ranking

* Derived by deducting the lowest impact measure from the highest in any impact category. The difference is then divided into equal ranges (H, M, L) and each impact measure assigned H, M, or L, depending on which range it falls

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APPENDIX E-3

Final Initial Screening Analysis – Bakersfield Area



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California High-Speed Train Project



Merced to Bakersfield EIR/EIS

ALTERNATIVES ANALYSIS REPORT

FINAL

INITIAL SCREENING MEMORANDUM - BAKERSFIELD AREA

Prepared by:

URS/HMM/Arup Joint Venture



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1.0 INTRODUCTION

This memorandum documents the Initial Screening of alternatives for alignment of the California High-Speed Train (CAHST) Project through Bakersfield, California. The screening process compares the extent to which a range of alternatives meets the purpose for the High-Speed Train (HST) Project, on the basis of engineering, operational and environmental criteria defined by the California High-Speed Rail Authority (Authority). The findings of this screening will be used to identify alternatives to carry forward for Preliminary Alternatives Analysis. The methodology, data sources and metrics used in the Initial Screening are consistent with the direction provided in the *CAHST Project Alternatives Analysis Methods for Project-Level Environmental Impact Report/Environmental Impact Statement (EIR/EIS) Technical Memorandum* (December 2008).

1.1 PROJECT BACKGROUND

The CAHST Project will provide intercity HST service over more than 800 route-miles throughout California, connecting the major population centers of Sacramento, the San Francisco Bay Area, the Central Valley, Los Angeles, the Inland Empire, Orange County, and San Diego. The HST system is envisioned as a state-of-the-art, electrically powered, high-speed, steel-wheel-on-steel-rail network, including state-of-the-art safety, signaling, and automated train-control systems. The trains will be capable of operating at speeds of up to 220 miles per hour (mph) over a fully grade-separated alignment, with an expected express trip time between San Francisco and Los Angeles of 2 hours and 40 minutes.

1.1.1 Merced to Bakersfield Project EIR/EIS Background

The Authority has initiated project-level preliminary engineering and environmental review on eight individual sections of the statewide system. This study is a part of the engineering definition and environmental review of the HST system between Merced and Bakersfield, one of the eight segments of the system currently undergoing similar analyses:

- Sacramento to Merced
- San Jose to Merced
- San Francisco to San Jose
- Merced to Bakersfield
- Bakersfield to Palmdale
- Palmdale to Los Angeles
- Los Angeles to Anaheim
- Los Angeles to San Diego

With this study, the Authority will generate alternatives to be evaluated in detail during the environmental documentation for the HST system, under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). This technical memorandum focuses on HST alignment alternatives for the system through Bakersfield, and identifies criteria for their comparison and differentiation.

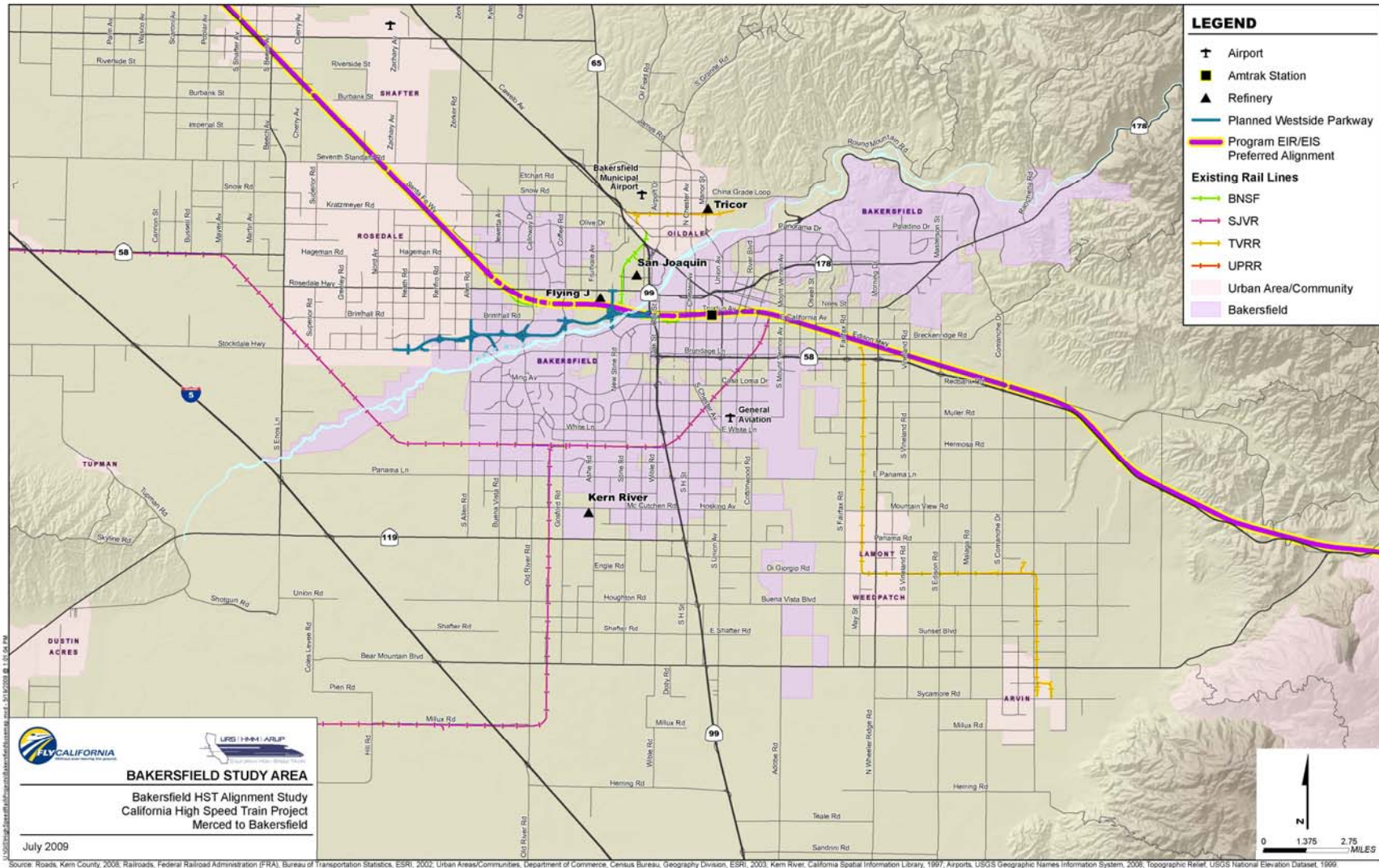
The Merced to Bakersfield HST Project EIR/EIS will tier from the Final Statewide Program EIR/EIS and the Final Bay Area to Central Valley HST Program EIR/EIS in accordance with Council on Environmental Quality regulations and State CEQA Guidelines based upon all previous work prepared for and incorporated in the Statewide Program EIR/EIS and the Bay Area to Central Valley HST Program EIR/EIS.

1.1.2 Study Area

The Bakersfield Planning Study focuses on HST alignment alternatives for the system through Bakersfield, and identifies criteria for their comparison and differentiation. This technical memorandum represents the first step in evaluating alternatives that have been identified as a result of the Program EIR/EIS, through stakeholder meetings and the public scoping process, and by the URS/HMM/Arup Joint Venture Technical Team. The alternatives were developed to allow non-stop express trains and regional trains to share right-of-way (ROW) and for the regional trains to stop in a station area in downtown. The area of study for developing alignment alternatives extends for approximately 20 miles from the community of Rosedale on the west to the community of Edison on the east. Through central Bakersfield, the northern and southern boundaries extend out approximately 2 miles to the north and south of the Burlington Northern Santa Fe (BNSF) right-of-way. As the alignment travels east, the study area parallels the Union Pacific (UPRR) ROW along the Edison Highway and State Route 58 (see Figure 1).

Local land use considerations for planning the HST alignment in the Bakersfield study area include the Flying-J refinery, the site of a proposed Bakersfield Commons development west of Coffee Road, Bakersfield Plaza shopping center, and in the downtown area, Bakersfield High School, the Bakersfield Amtrak Station, City of Bakersfield administrative buildings, Superior Court, Kern County administrative building, Rabobank Arena and Convention Center, and the Main Library. In addition, the City's Aquatic Park and Mill Creek Housing, a key project in the Mill Creek Redevelopment Area are located immediately south of the BNSF ROW near the Amtrak Station.

Figure 1
Bakersfield Study Area



1.2 ALTERNATIVES ANALYSIS PROCESS AND METHODOLOGY

The alternatives to be evaluated in the Project EIR/EIS for the Merced to Bakersfield region of the HST network will be defined via a two-step process, entailing an Initial Screening, followed by a Preliminary Alternatives Analysis.

The Initial Screening considers a broad range of alternatives, starting with the Preferred Alternative identified in the Program EIR/EIS selected for the state-wide HST network. Additional alternatives have been developed by the Technical Team with input from local stakeholders, that refine the Program EIR/EIS Preferred Alternative or that reflect a vital theme or concept, such as lowest travel time, alignment with another linear facility, or avoidance of known potential impacts. Other alternatives have been proposed via the public scoping process and are consistent with the HST project's Purpose and Need and system criteria.

The Initial Screening identifies major conflicts that may exist between the alternatives and considerations such as: existing or planned development, environmentally sensitive land uses, and physical constraints to HST operating speed. Some of these types of conflicts are immediately apparent via inspection of the study area and applicable maps and documents. The alternatives are further compared via a qualitative assessment of their relative impacts to the natural and man-made environments, the complexity of their construction and operation, and their fulfillment of HST system criteria. On the basis of the Initial Screening, a limited field of alternatives is suggested to advance to the Preliminary Alternatives Analysis.

Alternatives have been initially screened using the criteria identified in Section 2.2. This Initial Screening may result in a number of alternatives being eliminated. At this point in the project, a follow-up consultation with stakeholders through a series of workshops with the public and the Authority/Federal Railroad Administration (FRA) will be used to brief them on the Initial Screening analysis and to solicit additional input and specifically for the Authority/FRA to seek approval to advance the alternatives into the Preliminary Alternatives Analysis.

After this Initial Screening, the remaining alternatives will be refined and subjected to a Preliminary Alternatives Analysis. The Preliminary Alternatives Analysis will compare the smaller field of refined alternatives on the basis of more detailed and quantitative metrics. Upon completion of the Preliminary Alternatives Analysis, the Authority will determine which alternatives should be carried forward for more detailed analysis during the project-level environmental documentation according to NEPA and CEQA guidelines.

1.3 PURPOSE OF THIS SCREENING MEMORANDUM

This Initial Screening Memorandum describes the metrics, data sources, and methodology used in the Initial Screening of alternatives for HST through Bakersfield, and presents findings that support the selection of alternatives to be subjected to more detailed comparison in the subsequent Preliminary Alternatives Analysis. This Initial Screening evaluates the alternatives based on engineering, operational and environmental criteria defined by the Authority in the Authority's *Alternatives Analysis Methods for Project-Level EIR/EIS Technical Memorandum* (December 2008).

The purpose of the Initial Screening is not to accurately quantify impacts associated with individual alternatives, but to broadly differentiate among alternatives on the basis of criteria that will be applied in greater detail in the EIR/EIS process.

The Initial Screening analysis begins with the Program EIR/EIS Preferred Alignment selected at the conclusion of the 2005 Final Statewide Program EIR/EIS process. Public and agency comments received during the Project EIR/EIS scoping process and during ongoing interagency coordination meetings, and direction from the Authority and FRA were used to identify initial alternatives to carry forward for the Initial Screening. After identifying the initial alternatives, alignment plans, profiles, and cross-sections have been developed and used for the Initial Screening analysis.

The objectives of this memorandum are to document the Initial Screening process used to identify alternatives, and to identify those alternatives for which environmental issues (severe conflicts or constraints) or engineering constraints justify dropping them from further analysis. Alternatives are dropped from further consideration if they are not reasonable, practicable, and feasible. Major issues that could qualify an alternative to be dropped include:

- Alternative has environmental or engineering issues that would make approvals or implementation infeasible.
- Alternative produces unavoidable or difficult to mitigate environmental impacts.
- Alternative is not feasible or practicable to construct.

2.0 SCREENING CRITERIA

As defined in the Authority's *Alternatives Analysis Methods for Project-Level EIR/EIS Technical Memorandum* (December 2008), the alternatives were first defined by using system performance and design criteria to address the unique characteristics of HST operation. The alternatives were then subjected to the Initial Screening based on three general criteria also defined in the Authority's technical memorandum. This section outlines the HST Design Objectives and describes the development of Initial Screening criteria based on the Authority's guidance.

2.1 HST PERFORMANCE OBJECTIVES AND DESIGN CRITERIA

Initial alignment alternatives and station locations have been developed to meet HST system performance objectives according to fundamental design criteria identified in Table 1.

Table 1
HST Performance Objectives and Design Criteria

Performance Objective	Design Criteria
Maximize ridership/revenue potential	<ul style="list-style-type: none"> ▪ Travel time ▪ Route length ▪ Speed
Maximize connectivity and accessibility	<ul style="list-style-type: none"> ▪ Intermodal connections
Minimize operating and capital costs	<ul style="list-style-type: none"> ▪ Construction, operations and maintenance issues and costs

Source: CAHST *Alternatives Analysis Methods for Project EIR/EIS Technical Memorandum* (December 2008)

2.2 INITIAL SCREENING CRITERIA

The Authority broadly defined the following three general criteria to be used in the Initial Screening of the alternatives:

- Severe Constraints
- Conflicts with Existing Conditions
- Conflicts with Approved Future Development in the Study Area

Based on these three criteria categories, the Technical Team defined and developed more specific metrics that were used to evaluate relative impacts among alternatives, and particularly to identify key differentiators (Table 2). Whereas the metrics used for comparison are generally quantitative, they support a qualitative, narrative evaluation of the alternatives, summarized in Section 4.0.

Table 2
Initial Screening Criteria and Data Sources

Criterion	Metric	Source
SEVERE CONSTRAINTS		
Engineering complexity	Number of miles of alignment elevated, at-grade, and below-grade	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography
	Number of major waterways (river and canals) crossed by the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data
Limiting speed	Lowest operating speed at any point on the alignment	<ul style="list-style-type: none"> ▪ Concept drawings
Railroad right-of-way access	Number of miles of alignment that require shared use of freight railroad rights-of-way	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ Discussions with freight railroads (if possible)
Public right-of-way access	Number of miles of alignment that require shared use of Caltrans/highway rights-of-way	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ Discussions with Caltrans (if possible)
Railroad operations	Number of active railroad sidings that will be severed by the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ Discussions with freight railroads (if possible)
Operational safety	Location of the alternative relative to property or features that could endanger safe HST operation	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography

Table 2
Initial Screening Criteria and Data Sources

Criterion	Metric	Source
CONFLICTS WITH EXISTING CONDITIONS		
Land use impacts	Station located relative to the host cities' designated central business district	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ Local planning documents ▪ GIS data ▪ Input from local planning agencies
	Number of miles of the alignment that traverse agricultural (includes all definition of agricultural land) land	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data
Section 4(f) impacts	Number of Section 4(f) resources located within ¼-mile of the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data
Community impacts	Number of miles of alignment that traverse incorporated communities and census-designated places	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data ▪ County parcel data
	Number of census tracts of low income population (10% above the county established poverty line) within ¼-mile of the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data ▪ County parcel data
Property impacts	Number of agricultural parcels traversed by the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data ▪ County parcel data
	Number of residential parcels traversed by the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data ▪ County parcel data
	Number of commercial parcels traversed by the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data ▪ County parcel data

Table 2
Initial Screening Criteria and Data Sources

Criterion	Metric	Source
	Number of industrial parcels traversed by the alignment	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ GIS data ▪ County parcel data
Connectivity	Integration of the station site with the existing road and traffic network	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ Local planning documents ▪ Input from local planning agencies
	Integration of the station site with the existing transportation network	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ Local planning documents ▪ Input from local planning agencies
APPROVED FUTURE DEVELOPMENT IN THE STUDY AREA		
Land use impacts	Number of parcels planned for development (commercial, industrial and residential) traversed by the alignment	<ul style="list-style-type: none"> ▪ Regional and local planning documents and land use analysis ▪ Input from local planning agencies ▪ County parcel data ▪ GIS data
	Number of parcels planned for development (commercial, industrial and residential) impacted by the station footprint	<ul style="list-style-type: none"> ▪ Concept drawings ▪ Aerial photography ▪ Local planning documents ▪ Input from local planning agencies
Public and political support	Support for the alternative by regional/local plans and policies	<ul style="list-style-type: none"> ▪ Regional and local planning documents and land use analysis ▪ Input from local planning agencies

3.0 ALTERNATIVES CONSIDERED

The Bakersfield HST alignment alternatives considered in the Initial Screening include the Program EIR/EIS Preferred Alignment, alternatives developed by the Technical Team for this segment with input from local stakeholders and public scoping comments.

3.1 ALIGNMENT ALTERNATIVES

3.1.1 Program EIR/EIS Preferred Alternative

The Program EIR/EIS considered two HST alternatives through Bakersfield:

- UPRR Alternative: This alternative used the existing UPRR alignment with two entrances into Bakersfield. One entrance was via the UPRR corridor and served a station at Golden State and the other transitioned to the BNSF corridor west of Bakersfield and served a station at Truxtun Avenue. In both cases, the alternative followed the UPRR alignment east of Kern Junction to access the Tehachapis.
- BNSF Alternative: This alternative followed the existing BNSF route into Bakersfield with a station at Truxtun Avenue. The alignment continued via the UPRR corridor east of Kern Junction to access the Tehachapis.

The BNSF alternative traveling through Bakersfield, continuing via the UPRR corridor east of Kern Junction was selected as the preferred alignment (Figure 1). In addition, the City of Bakersfield and Kern County in conjunction with the Kern Council of Governments studied three high speed rail station options:

- Truxtun Avenue at S Street/Union Avenue (BNSF alignment),
- Golden State/M Street (UPRR alignment), and
- 7th Standard Road West/State Route 99 (Airport Station along the UPRR alignment).

The Truxtun Avenue site in the vicinity of the Amtrak station was selected as the preferred station location. The analysis and recommendations are presented in the Kern Council of Government's *Metropolitan Bakersfield High Speed Rail Terminal Impact Analysis* (July 2003).

3.1.2 Stakeholder/Technical Team Generated Alternatives

3.1.2.1 Preliminary Set of Alternatives

As indicated in Section 1.1.2, multiple alignment alternatives, including the Program EIR/EIS Preferred Alignment and design variations, were initially considered for this study. Alternatives 1, 2, and 3 represented sets of alternatives that were essentially variations of the Program EIR/EIS Preferred Alignment, following the BNSF ROW yet deviating where possible to increase operating speed, to minimize potential impacts, or to use the ROW of existing or planned road infrastructure. These alternatives provided access to the preferred station location at Truxtun Avenue and unlike the Program EIR/EIS Preferred Alignment, the alternatives avoided the Town of Edison. Alternative 4 deviated substantially from the BNSF ROW to potentially reduce impacts and to maintain the design speed. All alternatives avoided use of the UPRR ROW by paralleling the railroad and bypassing the Town of Edison to access the State Route 58 ROW. The four sets of alternatives including sub-alternatives (options) were defined as follows:

Alternative 1 represented alignments that avoided the Flying-J refinery by traveling south of the property.

- Option 1A – Operated at reduced speed south of the refinery and through the BNSF yard and the BNSF ROW to access the downtown station.
- Options 1B and 1C – Designed to avoid the refinery but with a more substantial (tighter radius) curve, slowing operation to substantially less than allowed by Authority's design criteria.
- Option 1D – Designed to maintain optimal speed while bypassing the refinery joining the BNSF ROW to travel through downtown to access the downtown station.

- Option 1E – Maintained the design speed throughout its alignment curving south of the refinery and then east along California Avenue but not accessing a downtown station.

Alternative 2 included alignments traveling along the BNSF corridor through the Flying-J refinery.

- Option 2A – Operated at reduced speed through the refinery, the BNSF yard and along the BNSF ROW to access the downtown station.
- Option 2B – Followed the BNSF alignment at much reduced speeds through the refinery and into downtown to access the downtown station.
- Option 2C – Designed to maintain optimal speed while traversing the refinery crossing over the BNSF ROW to travel through downtown to access the downtown station.

Alternative 3 was similar to Alternative 2, but used the proposed roadway alignments of the Centennial Corridor east of the Kern River.

Alternative 4 represented alignments that avoided the center of Bakersfield taking advantage of the public ROW (should be more explicit) where possible but not offering the opportunity for a downtown station.

The alternatives were presented to local officials and agency staff at stakeholder meetings held on December 4-5, 2008 and on January 28-29, 2009, and at the first Technical Advisory Group (TAG) meeting held on March 14, 2009.

3.1.2.2 Preliminary Alternatives Eliminated from Consideration

An internal review of the preliminary alternatives with Authority staff on March 5, 2009 determined that Alternative 4 could not meet the purpose and need of providing a downtown station and deviated substantially from the Program EIR/EIS Preferred Alignment, and therefore should be dropped. Alternative 3, paralleling proposed road alignments for the Centennial Corridor, was eliminated because it could not maintain required speed levels along this corridor without cutting through established residential communities.

For Alternative 1, Option 1E was dropped from further consideration due to its displacement of businesses in the Bakersfield Plaza shopping center and Family Medical Plaza, the effect of an aerial structure on the visual setting of and access to Bakersfield High, and the displacement of two traffic lanes along California Avenue to accommodate the HST alignment. In addition, this alignment required a second set of tracks that diverted from California Avenue through the BNSF yard and around Bakersfield High to access the preferred station location. Options 1B and 1C were also eliminated because the alignments could not maintain reasonable operating speeds (slower than 120 mph) and produced substantial land use impacts. Similarly, for Alternative 2, Option 2B, which most closely followed the BNSF alignment, was eliminated because of the effects of the curved track on operating speeds, which reduced speeds to 120 mph or less.

3.1.2.3 Alternatives Carried Forward for Screening

Of the preliminary set of alternatives, options from Alternatives 1 and 2 plus the Program EIR/EIS Preferred Alignment were carried forward for the Initial Screening depicted in Figure 2 and as summarized in Table 3. These remaining alternatives were refined to identify where express tracks would diverge from the tracks serving the HST station and where ROW and land use constraints precluded operating HST at-grade. For all alternatives, the HST alignment was assumed to expand from two tracks to four tracks approximately one mile to the west and east of the HST station to be located near the current Amtrak station. Profiles and cross sections at critical locations were prepared to clarify the engineering issues for the stakeholders and to assist in the Initial Screening process.

The alternatives carried forward for screening are described in more detail below.

Program EIR/EIS Preferred Alignment

The geometry of this alignment provides a minimum operating speed of 190 mph that can be maintained throughout the city. In some locations, the geometry allows an operating speed of 220 mph to be achieved.

- The two-track, 60-foot HST alignment follows the BNSF ROW at-grade into the city from the north, diverting east of Allen Road and traversing a residential area to the north of the BNSF ROW before rejoining the BNSF ROW through the Flying-J refinery, where it expands to a four-track, 100-foot alignment and transitions from at-grade to elevated profile.
- The four-track alignment continues across the Kern River on its own structure close to the BNSF bridge, crossing over State Route 99 and entering the downtown area on an elevated structure along the north side of the BNSF ROW.
- As it traverses downtown, the alignment remains on an elevated structure displacing important civic buildings, including Superior Court, the Convention Center, and the Library, all located south of Truxtun Avenue, before entering the HST station on Truxtun.
- The four-track alignment parallels the BNSF ROW skirting commercial areas of East Bakersfield and curving southeast to parallel the UPRR ROW on the southside of the alignment.
- The alignment returns to grade in a two-track configuration east of Mount Vernon Avenue and continues at-grade along the UPRR ROW through the town of Edison, displacing industrial uses along the southside of the tracks.

Alternative 1, Option 1A – Circumventing Refinery, Reduced Speed

The geometry of this alignment allows a minimum operating speed of 190 mph to be maintained throughout the city. In some instances, the geometry allows the design speed of 250 mph to be achieved.

- The two-track, 60-foot HST alignment follows the BNSF ROW at-grade into the city from the north, deviating from the BNSF ROW as it approaches Palm Avenue and passing through residential and industrial uses, including the site of the proposed Bakersfield Commons development.
- The alignment traverses residential neighborhoods south of the BNSF ROW before entering the Westside Parkway ROW immediately south of the Flying-J refinery, where it becomes elevated.
- After crossing the Kern River near the Mohawk Street Extension, the alignment remains elevated but transitions to four-track, 100-foot horizontal alignment as it skirts the northern edge of the Bakersfield Plaza shopping center, passing over State Route 99 and the BNSF yard paralleling the BNSF ROW on the south through commercial and Bakersfield High parcels.. The four-track aerial structure enters the HST station, located south of the BNSF ROW near the Amtrak station (see Section 3.2 for discussion of HST station).
- The elevated alignment diverts from the BNSF ROW at Baker Street, paralleling East Truxtun Avenue through commercial and industrial uses in East Bakersfield before entering the Edison Highway ROW.
- The alignment transitions to a two-track, at-grade alignment east of Oswell Street along Edison Highway.

- The two-track alignment continues in a southeasterly direction deviating from the Edison Highway east of Fairfax and crossing into the State Route 58 ROW near South Edison Road, bypassing the Town of Edison.

Alternative 1, Option 1D – Circumventing Refinery, Optimal Speed

The geometry of this alignment allows the design speed of 250 mph to be achieved throughout the city.

- The two-track, 60-foot HST alignment follows the BNSF ROW into the city from the north, deviating from the BNSF ROW near Cactus Drive, traversing a residential neighborhood north of the BNSF ROW before crossing over the BNSF ROW in a southeasterly direction at Calloway Drive.
- The alignment continues in a southeasterly direction across industrial uses and an undeveloped area that is slated for a regional shopping center west of Coffee Road, entering the Westside Parkway ROW on an elevated structure to bypass the Flying-J refinery on the south.
- The alignment crosses the Kern River near the Mohawk Street Extension, transitioning to four-track, 100-foot horizontal alignment as it skirts the northern edge of the Bakersfield Plaza shopping center, passing over State Route 99 and following the BNSF ROW, on an aerial structure to enter the HST station on the south side of the BNSF mainline track west of Union Avenue.
- The elevated alignment continues directly east through residential neighborhoods of East Bakersfield, curving southeast into the Edison Highway ROW before transitioning to a two-track, at-grade alignment east of Oswell Street.
- The at-grade alignment diverts from Edison Highway at South Vineland Road, passing through agricultural land and the southern edge of the Town of Edison to reach the State Route 58 ROW near Malaga Road.

Alternative 2, Option 2A – Traversing Refinery, Reduced Speed

The geometry of this alignment maintains an operating speed of 220 mph throughout the city, closely approximating the Program EIR/EIS preferred alignment.

- The two-track, 60-foot HST alignment follows the BNSF ROW at-grade into the city from the north, deviating from the BNSF ROW east of Allen Road through a residential neighborhood immediately north of the BNSF ROW.
- The alignment rejoins the BNSF ROW west of Coffee Road, transitioning from at-grade to elevated and from two tracks to four tracks as it traverses the Flying-J refinery.
- The alignment diverges from the BNSF ROW to cross over the Kern River, continuing on an elevated structure over State Route 99, and entering the downtown area through the BNSF yard and parcels along the southside of the BNSF ROW.
- The four-track, elevated alignment enters the HST station area on the southside of the BNSF ROW across from the Amtrak station (see Section 3.2 for discussion of HST station).
- Continuing east, the elevated alignment diverts from the BNSF ROW at Baker Street, paralleling East Truxtun Avenue through commercial and industrial uses in East Bakersfield before entering the Edison Highway ROW.
- The alignment transitions to a two-track, at-grade alignment east of Oswell Street along Edison Highway.

- The two-track alignment continues in a southeasterly direction deviating from the Edison Highway east of Fairfax and crossing into the State Route 58 ROW near South Edison Road, bypassing the Town of Edison.

Alternative 2, Option 2C – Traversing Refinery, Optimal Speed

The geometry of this alignment allows the design speed of 250 mph to be achieved throughout the city.

- The two-track, 60-foot HST alignment follows the BNSF ROW at-grade into the city from the north, deviating from the BNSF ROW near Allen Road through a residential neighborhood immediately to the north of the BNSF ROW.
- The alignment rejoins the BNSF ROW at Coffee Road, transitioning from at-grade to elevated and from two tracks to four tracks as it traverses the Flying-J refinery.
- From the Flying-J refinery, the elevated alignment curves to the southeast as it diverges from the BNSF ROW to cross the Kern River and State Route 99, passing through commercial property on the northside of the BNSF ROW before crossing to the southside of the ROW at F Street.
- The alignment traverses the downtown area on the parcels south of the BNSF ROW, entering the HST station area on the southside of the BNSF ROW with four elevated tracks spanning Union Avenue.
- Traveling east from Union, the alignment skirts the East Bakersfield residential neighborhood before crossing to the northside of the UPRR ROW at Mount Vernon Avenue.
- The alignment continues to parallel the UPRR ROW on the north, transitioning to a two-track, elevated alignment that curves southeasterly across the UPRR ROW near Vineland Road.
- The alignment returns to grade as it traverses agricultural land west of South Edison Road and the southern edge of the Town of Edison before entering the State Route 58 ROW near Malaga Road.

3.1.3 Public and Agency Scoping Generated Alternatives

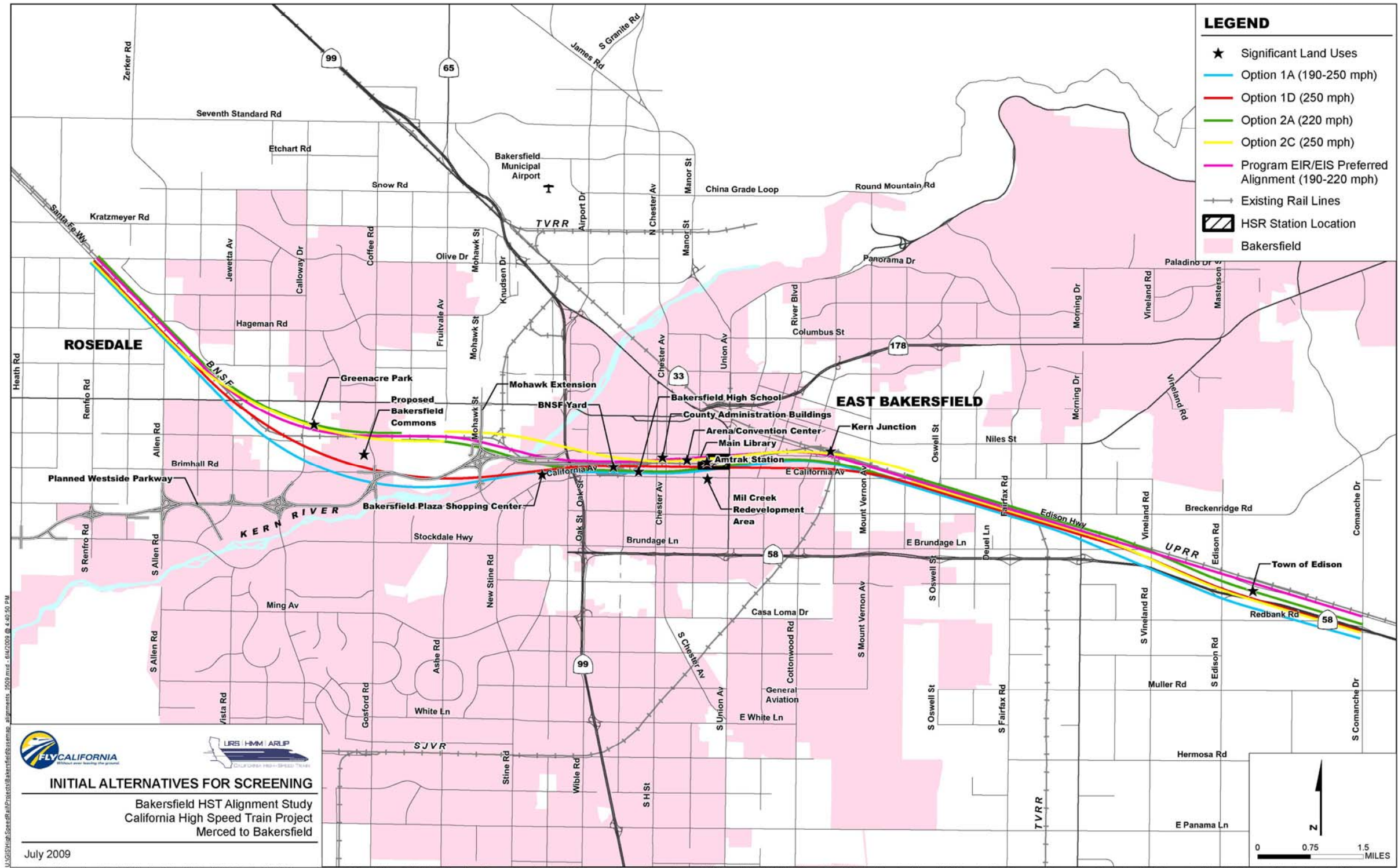
Scoping comments related to high speed rail in Bakersfield focused on the issue of station location. Although preferences for previously studied locations were indicated by several commenters, the selected station location at Truxtun Avenue was favored by most commenters.

3.2 STATION ALTERNATIVES

As indicated previously, the City of Bakersfield, Kern County, and Kern Council of Governments agreed that the preferred location for HST would straddle the BNSF ROW at the current Amtrak Station (Figure 3). The multi-modal station would be located within a band that extends from Truxtun Avenue on the north to the city redevelopment area east of P Street on the south. The station would contain 1,380-foot long platforms for train boarding and have a minimum of four tracks, two of which would allow express trains to pass through the station at 220 mph. The station concept plan and design would be developed in concert with the local agencies after the Alternatives Analysis process determined which alternatives would be carried forward for environmental review.

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Figure 2
Initial Alternatives for Screening



**TABLE 3 – Merced to Bakersfield (Bakersfield Study)
Alignments to be Carried Forward for Initial Screening**

Alternative	Alternative Description	Origin	Scope	Predominant Profile	Station Location	Theme / Comments
Program EIR/EIS Preferred Alignment	Parallels BNSF and UPRR ROW	Program EIR/EIS	Full Alignment Alternative	Combination of At-Grade and Elevated	Truxtun	Deviates from BNSF and displaces residences in the Greenacres neighborhood before rejoining BNSF alignment through the Flying-J refinery. Avoids impacts to commercial areas north of the BNSF at State Route 99, but cuts through the Convention Center area, displacing multiple civic buildings to access Truxtun station location. Elevated station with 4 tracks. Follows the UPRR ROW to the southeast, removing the packing industries abutting the UPRR in Edison. Travels at reduced speed of 190 mph.
1A	Circumventing (south of) Refinery, Reduced Speed	Technical Team / Stakeholders	Full Alignment Alternative	Combination of At-Grade and Elevated	Truxtun	Deviates from the BNSF west of the Flying-J refinery through underused land and avoiding substantial land use impacts between Kern River and State Route 99, but at reduced operating speed (200 mph). Elevated station with 4 tracks.
1D	Circumventing (south of) Refinery, Optimal Speed	Technical Team / Stakeholders	Full Alignment Alternative	Combination of At-Grade and Elevated	Truxtun	Deviates from the BNSF west of the Flying-J refinery producing land use impacts in Greenacres residential neighborhood, on Bakersfield Plaza between Kern River and State Route 99, and north of UPRR in East Bakersfield while maintaining design speed (250 mph) throughout. Elevated station with 4 tracks.
2A	Traversing Refinery, Reduced Speed	Technical Team / Stakeholders	Full Alignment Alternative	Combination of At-Grade and Elevated	Truxtun	Most closely follows the Program EIR/EIS Preferred Alignment at similarly reduced operating speed (200 mph). Affects land uses in Greenacres residential neighborhood and commercial property north of the BNSF ROW near State Route 99, including the City of Bakersfield Corporate Yard. Elevated station with 4 tracks.
2C	Traversing Refinery, Optimal Speed	Technical Team / Stakeholders	Full Alignment Alternative	Combination of At-Grade and Elevated	Truxtun	Reduced curve radii cause most severe impacts to Greenacres residential neighborhoods, commercial district north of BNSF at State Route 99, and in East Bakersfield while maintaining design speed (250 mph) throughout. Elevated station with 4 tracks.

ARENA/CONVENTION CENTRE

KERN CO ADMIN

SUPERIOR COURT CITY BUILDINGS

LIBRARY

AMTRAK STATION

AQUATIC CENTER

CALIFORNIA HIGH SPEED TRAIN PROJECT
BAKERSFIELD ALIGNMENT STUDY
STATION LOCATIONS

DESIGNED BY
A. TRAYLEN

DRAWN BY
A. TRAYLEN

CHECKED BY
P. WILSON

IN CHARGE
M. WEISMAN

DATE
05-01-2009

CONTRACT NO.

DRAWING NO.
237507-SK-0084

SCALE
AS SHOWN

SHEET NO.
1 OF 1

4.0 INITIAL SCREENING RESULTS

This section presents the analysis of the initial screening of the alternatives. Each of the alternatives is discussed in response to the evaluation criteria, with pros and cons, major concerns, and conclusion regarding the disposition of the alternative. Station locations are defined and evaluated as integral parts of the alternatives and are addressed in the respective descriptions and discussions of the alternatives.

4.1 OBJECTIVE AND PROCESS

The evaluation process resulted in the population of a matrix that tabulates the metrics of each alternative and option according to the criteria presented in Table 4. The complete summary of the Initial Screening is presented in matrix form as Appendix A. The numeric scores with which the matrix is populated have been reviewed and the range of scores for each criterion parsed into ranges of generally high, medium and low impact, the lower range being preferable to the higher range. These ranges and the scores of each alternative illuminate both (a) gross differentiators among the alternatives and (b) the relative impacts of all the alternatives and options. These ranges and differentiators are the basis for narrative discussion of the alternatives and the reasons to advance them to the Preliminary Alternative Analysis.

Table 4
Initial Screening Criteria and Scoring Ranges

Criterion	Metric	Scoring Range
SEVERE CONSTRAINTS		
Engineering complexity	<u>Number of miles</u> of alignment elevated, at-grade, and below-grade	<ul style="list-style-type: none"> High impact Medium impact Low impact
	<u>Number of major waterways</u> (river and canals) crossed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
Limiting speed	<u>Lowest operating speed</u> at any point on the alignment	<ul style="list-style-type: none"> < 219 mph 220 – 249 mph > 250
Railroad right-of-way access	<u>Number of miles</u> of alignment that require shared use of freight railroad rights-of-way	<ul style="list-style-type: none"> High impact Medium impact Low impact
Public right-of-way access	<u>Number of miles</u> of alignment that require shared use of Caltrans/highway rights-of-way	<ul style="list-style-type: none"> High impact Medium impact Low impact
Railroad operations	<u>Number of active railroad sidings</u> that will be severed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
Operational safety	Does the Alternative traverse property or features that could <u>endanger safe HST operation</u> ?	<ul style="list-style-type: none"> Yes Unable to determine No
CONFLICTS WITH EXISTING CONDITIONS		

Table 4
Initial Screening Criteria and Scoring Ranges

Criterion	Metric	Scoring Range
Land use impacts	Is the station located in the cities' designated <u>central business district</u> ?	<ul style="list-style-type: none"> No Unable to determine Yes
	<u>Number of miles</u> of the alignment that traverse agricultural (includes all definition of agricultural land) land	<ul style="list-style-type: none"> High impact Medium impact Low impact
Section 4(f) impacts	<u>Number of Section 4(f) resources</u> located within ¼-mile of the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
Community impacts	<u>Number of miles</u> of alignment that traverse incorporated communities and census-designated places	<ul style="list-style-type: none"> High impact Medium impact Low impact
	<u>Number of census tracts</u> of low income population (10% above the county established poverty line) within ¼-mile of the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
Property impacts	<u>Number of agricultural parcels</u> traversed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
	<u>Number of residential parcels</u> traversed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
	<u>Number of commercial parcels</u> traversed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
	<u>Number of industrial parcels</u> traversed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
Connectivity	How well does the station site mesh with the <u>existing road and traffic network</u> ?	<ul style="list-style-type: none"> Poorly Average Well
	How well does the station site mesh with the <u>existing transportation network</u> ?	<ul style="list-style-type: none"> Poorly Average Well
APPROVED FUTURE DEVELOPMENT IN THE STUDY AREA		
Land use impacts	<u>Number of parcels</u> planned for development (commercial, industrial and residential) traversed by the alignment	<ul style="list-style-type: none"> High impact Medium impact Low impact
	<u>Number of parcels</u> planned for development (commercial, industrial and residential) impacted by the station footprint	<ul style="list-style-type: none"> High impact Medium impact Low impact
Public and political support	Is the alternative supported by <u>regional/local plans and policies</u> ?	<ul style="list-style-type: none"> No Unable to determine Yes

4.2 ALTERNATIVE SCREENING FINDINGS

For the initial screening, the following alternatives were evaluated:

- Program EIR/EIS Preferred Alternative
- Alternative 1, Option 1A – Circumventing Refinery, Reduced Speed
- Alternative 1, Option 1D – Circumventing Refinery, Optimal Speed
- Alternative 2, Option 2A – Traversing Refinery, Reduced Speed
- Alternative 2, Option 2C – Traversing Refinery, Optimal Speed

Plans and cross-sections for the alternatives were compared against engineering and environmental data generated by Geographic Information Systems (GIS) to screen the five alternatives listed above and identified in Table 3. The major trade-offs among alternatives, particularly for those criteria that indicate substantial differences in engineering or environmental impacts, were identified and described. The trade-offs and outstanding issues are summarized by alternative below.

4.2.1 Program EIR/EIS Preferred Alignment

Pros

- Substantial at-grade alignment
- Minimal intrusion into BNSF yard
- Few water crossings
- Displaces minimal amount of agricultural land

Cons

- Traverses Flying-J refinery, risk may not be mitigated
- Slowest speed, never achieving the design speed
- Displaces several important civic buildings
- Displacement of residences in Greenacres
- Displacement of industries along UPRR alignment in Edison
- Environmental justice (EJ) issues in Edison
- Most adjacent Section 4(f) properties
- No local support

Major Concerns

The Program EIR/EIS Preferred Alignment closely parallels the BNSF and UPRR mainline track with minimal intrusion into the freight rail rights-of-way (only 1.5 miles). In addition, the alignment remains at-grade through much of Bakersfield with few water crossings while avoiding substantial acreage of prime agricultural land, potentially diminishing capital cost. The cost advantage combined with minimized disruption to freight rail operation are counterbalanced by reduced operating speeds (190-220 mph) caused by the tight radius curves the alignment uses to follow the freight rail alignments. This alternative is the slowest of all alignments alternatives through Bakersfield, which would increase travel times for express trains operating between San Francisco and Los Angeles. Closely paralleling the freight rail corridors also adversely affects adjacent rail-dependent industries. For example, by being located just outside the UPRR ROW, multiple food processing and shipping industries in the Town of Edison would be displaced, affecting the residents of this low income community who rely on these industries for employment. In addition, the alignment must pass through extensive residential development in Greenacres and displace several important civic buildings including the Superior Court, Kern County Administrative building, the Rabobank Convention Center, and the library in order to access the preferred station location near the Amtrak station on Truxtun Avenue. The displacement of these civic buildings is unacceptable to the TAG.

Conclusion

The potential displacement of civic buildings and important employment activities in a low income community and overwhelming disapproval of the TAG warrants dropping the Program EIR/EIS Preferred Alignment from further consideration.

4.2.2 Alternative 1, Option 1A – Circumventing Refinery, Reduced Speed

Pros

- Greatest length of at-grade alignment
- Minimizes Flying-J refinery impacts on operation
- Fewest parks and historic sites nearby
- Fewest residential parcels affected
- HST station most proximate to Amtrak
- Few development areas affected
- Minimizes impact on East Bakersfield

Cons

- Most water crossings
- Could limit area for development of Bakersfield Commons, a planned, mixed-use community
- Intrudes on BNSF yard
- Four-track station would be elevated over BNSF mainline
- Displaces commercial/industrial parcels
- Traverses the campus of Bakersfield High
- Elevated station would cover BNSF mainline
- Most agricultural parcels affected
- Suboptimal speeds through East Bakersfield

Major Concerns

The Alternative 1 options avoid the Flying-J refinery by curving south of the refinery, paralleling the Westside Parkway ROW. Among all of the alternatives, Option 1A sweeps furthest from the refinery's facilities, thereby reducing the risk of operating electric-powered HST near, but not within, the refinery boundary. The risk may be further mitigated by constructing barriers along this at-grade section to minimize the impact of gas releases, pipeline ruptures and explosions at the refinery facilities to avoid consequences to HST operation. The sweeping curve allows for the operating speed of 220 mph to be maintained through this area. Unlike other options, the path around the refinery lessens potential displacement of housing and businesses in the Greenacres area. The Option 1A alignment becomes elevated to cross the Kern River and, as a four-track, elevated alignment, is more problematic as it enters the BNSF yard and downtown Bakersfield. An elevated structure would be required to cross the BNSF yard with piers placed in a configuration that would not disrupt freight operating, storage, and maintenance activities, and to allow passage through the Bakersfield High campus over the 14th Street ROW. Land uses south of the BNSF ROW would be displaced in order to enter the station area on tangent track positioned over the BNSF mainline. The positioning of the four-track station elevated over the BNSF mainline may not be desirable from the perspective of BNSF, but it allows a close transfer to modes operating at the Amtrak station. The angled position of the platform over the BNSF ROW allows the alignment to curve eastward around East Bakersfield, avoiding substantial displacement of uses south of Kern Junction. However, the curve necessary to minimize disruption to East Bakersfield reduces the alignment's speed to 190 mph in this section. East of Kern Junction, the alignment descends to grade and transitions more quickly than the other options to join the State Route 58 ROW. Since this alignment has the most extensive at-grade profile of the alternatives, it has the potential for lower capital cost.

Conclusion

This conclusion is to carry forward this alternative for subsequent analysis pending the outcome of discussions with BNSF regarding use of the BNSF yard for elevated HST alignment and with the Authority on maintaining optimum speed through Bakersfield. HST operating speeds for this alternative would be improved by following the Option 2A alignment east of the HST station area.

4.2.3 Alternative 1, Option 1D – Circumventing Refinery, Optimal Speed

Pros

- Substantial at-grade alignment
- Maintains optimal design speed throughout
- Minimizes Flying-J refinery impacts on operation
- Ideal station siting
- Avoids Bakersfield High
- Avoids BNSF yard
- Station would be located on structure immediately south of BNSF mainline in undeveloped area

Cons

- At-grade alignment severs Greenacres area
- Splits land proposed for Bakersfield Commons, a planned mixed-use community
- BNSF ROW is constrained through downtown Bakersfield which this alternative would share
- Proximity to greatest number of Section 4(f) parcels
- Substantial residential displacements
- Substantial commercial/industrial displacements
- Splits East Bakersfield, an EJ community

Major Concerns

The Alternative 1 options avoid the Flying-J refinery by curving to the south of the refinery, paralleling the Westside Parkway ROW. To maintain optimal speeds around the refinery, the curve begins further north along the BNSF ROW than for Option 1A and continues in a wide radius becoming elevated over the Westside Parkway and Kern River to enter downtown. The wide radius curve cuts through an undeveloped parcel whose owners are in current negotiation with the City to construct a mixed-use development. This alternative also displaces more businesses and residences in the Greenacres area than for Option 1A. The alignment enters downtown directly over the BNSF mainline track avoiding the BNSF yard and Bakersfield High and providing a straight line trajectory that allows the HST station to be located directly across the BNSF tracks from the Amtrak station in a vacant City-owned redevelopment area. To maintain the design speed east of the station, the alignment must continue its trajectory through East Bakersfield, displacing a substantial number of residences that house many minority and low income people. Displacements of industrial and commercial uses along Edison Highway may also be required depending on the placement of the alignment as it transitions from elevated to at-grade adjacent to or within the highway ROW. Although this alternative avoids the center of Edison, it may displace a few residential structures on the edge of Edison as it veers off Edison Highway into the State Route 58 ROW.

Conclusion

The conclusion is to carry forward this alternative for subsequent analysis pending the outcome of discussions with Authority on maintaining optimum speed through Bakersfield with the risk of substantial residential displacement.

4.2.4 Alternative 2, Option 2A – Traversing Refinery, Reduced Speed

Pros

- Substantial at-grade alignment

- Most shared use of highways
- Fewer residential parcels affected
- Fewest new development parcels
- HST station most proximate to Amtrak
- Maintains 220 operating speed
- Minimizes impact on East Bakersfield

Cons

- Traverses Flying-J refinery, risk may not be mitigated
- May impact Greenacres Park
- Cuts through Greenacres neighborhood
- Intrudes on BNSF yard
- Traverses Bakersfield High campus
- Elevated station would be above BNSF mainline

Major Concerns

This option most closely follows the path of the Program EIR/EIS Preferred Alignment without incurring civic building displacements in the downtown area. Compared with the Program EIR/EIS Preferred Alignment, the refined alignment maintains a faster, although not optimal operating speed of 220 mph throughout the Bakersfield area. It also has similar disadvantages as the Program EIR/EIS Preferred Alignment, including use of the constrained BNSF ROW to travel through the refinery and uncertainty of mitigating risk of explosion or gas release at the refinery to avoid consequences to HST operation. In addition, the alignment may affect Greenacres Park, a Section 4(f) property. The alignment would transition from at-grade to aerial in this section to cross over the planned Mohawk Avenue extension and the Kern River, entering downtown through the BNSF yard and Bakersfield High with impacts similar to those described for Option 1A. Land uses south of the BNSF ROW would be displaced in order to enter the station area on tangent track positioned over the BNSF mainline. The positioning of the four-track station elevated over the BNSF mainline may not be desirable from the perspective of BNSF, but it allows a close transfer to modes operating at the Amtrak station and maintains a 220 mph operating speed through the station and East Bakersfield without displacing the number of residences as in Option 1D. The alignment's position relative to Edison Highway and transition to State Route 58 produce similar potential impacts as those described for Option 1D.

Conclusion

The conclusion is to carry forward this alternative for subsequent analysis pending outcome of discussions with BNSF regarding use of the BNSF yard for elevated HST alignment and with the Authority on maintaining optimum speed through Bakersfield. In addition, to refine the alignment to avoid impact on Greenacres Park.

4.2.5 Alternative 2, Option 2C – Traversing Refinery, Optimal Speed

Pros

- Maintains optimal design speed
- Less commercial/industrial loss
- Least impact to agricultural parcels
- Avoids Edison Highway constraints
- Limited effect on development parcels

Cons

- Requires the greatest extent of elevated profile
- Potential for highest capital cost
- Directly affects Greenacres Park/Fruitvale Junior High
- Most extensive neighborhood impact on Greenacres

- Traverses Flying-J refinery, risk may not be mitigated
- Most residential displacement
- Crosses UPRR corridor twice
- Impacts BNSF yard and Bakersfield High
- HST station would be furthest from Amtrak station

Major Concerns

Option 2C maintains the design speed of 250 mph by deviating from the Program Level EIR/EIS Preferred Alignment and the BNSF ROW along wide-spaced curves that take the alignment through large sections of the Greenacres area and East Bakersfield, displacing the most residential parcels of all the alternatives. In addition, the alignment directly impacts Fruitvale Junior High School and Greenacres Park, a Section 4(f) property. The trajectory of the alignment allows it to rejoin the BNSF corridor through the Flying-J refinery and crosses over the Mohawk Avenue Extension and the Kern River. The wide radius curve leading into downtown crosses over the BNSF ROW, intruding on commercial properties, the BNSF yard and Bakersfield High, and multiple blocks containing commercial, parking and storage facilities as described for Options 1A and 2A. Although nominally within the proposed station area, the trajectory of the Option 2C alignment precludes the HST station from being located directly across from the Amtrak station. The four-track station would be located to the east above the BNSF ROW as it spans Union Avenue. The location may limit vehicular access to/from Union Avenue and require the pedestrian link to the Amtrak station to extend over a half-block in length. The alignment would remain elevated as it skirts East Bakersfield residential neighborhoods, maintaining this vertical profile to cross over the UPRR ROW east of Kern Junction and to pass through residential areas located just north of the UPRR ROW. The alignment would again cross over the UPRR ROW near Vineland Road before descending to grade and joining the State Route 58 ROW as described for Option 1D. Like Option 1D, this alternative avoids the center of Edison, but may displace a few residential structures on the edge of Edison as it veers off the Edison Highway into the State Route 58 ROW. Although the alignment has fewer water crossings than the other alternatives, it may have the highest capital cost because of the extent of elevated profile and the number of residential properties it would displace.

Conclusion

This alternative is potentially the most expensive to construct, the most disruptive to residential neighborhoods, parks and schools, and has the least favorable station placement. Although it maintains optimal speed throughout Bakersfield, the current alignment needs to be redrawn to avoid impacts to parks and schools to warrant further consideration.

4.2.6 Stations Analyzed

For Bakersfield planning study, the decision by the local governments to locate the HST station at the site of the present Amtrak station was assumed for all alternatives (refer to Section 3.2). Because the platforms for the station need to be located on tangent track and extend for 1,380 feet, the location of the HST station may vary slightly depending on the alignment of the alternative through the station area. For all alternatives, the HST station can be accommodated within the area of the Amtrak station (refer to Figure 3). As such, the station location is not a factor in selecting alternatives to be carried forward. More detailed station area planning will be done at the end of Alternatives Analysis for the alternatives carried forward for environmental evaluation.

4.3 SUMMARY

Based on the Initial Screening, the following alternative should be eliminated from further consideration:

- Program EIR/EIS Preferred Alternative

The remaining alternatives (Options 1A, 1D, 2A, and 2C) will be carried forward pending resolution of major issues needing further scrutiny by the Authority. The issues include:

- The level of risk for alignments traversing the Flying-J refinery (affects Options 2A and 2C)
- The BNSF requirements for allowing elevated HST tracks to be placed over BNSF yard and mainline ROW (affects all options, particularly Options 1A and 2A)
- The imperative need to avoid the Bakersfield High campus and buildings (affects Options 1A, 2A and 2C)
- The substantial number of residences displaced by the optimal speed alternatives (affects Options 1D and 2C)
- The shared use of the Westside Parkway, Edison Highway and State Route 58 ROW (affects all options)

After further examination and evaluation of these issues, the Authority may elect to eliminate one or more of the remaining alternatives from being carried forward.

Table 5 summarizes the outcome of the analysis by alternative.

TABLE 5 – Merced to Bakersfield (Bakersfield Study) Summary of Initial Screening						
Alternative	Alternative Description	Origin	Scope	Predominant Profile	Station Location	Conclusion
Program EIR/EIS Preferred Alignment	Parallels BNSF and UPRR ROW	Program EIR/EIS	Full Alignment Alternative	Combination of At-Grade and Elevated	Truxtun	This alternative requires the displacement of several civic buildings and industries employing low income residents. The TAG recommended dropping this alternative from further consideration.
1A	Circumventing (south of) Refinery, Reduced Speed	Technical Team / Stakeholders	Full Alignment Alternative	Combination of At-Grade and Elevated	Truxtun	Reduced operating speed allows fewer residential displacements. Carry forward pending discussions with the Authority related to the value of carrying forward alternatives that do not allow optimal speed and intrude on BNSF yard.
1D	Circumventing (south of) Refinery, Optimal Speed	Technical Team / Stakeholders	Full Alignment Alternative	Combination of At-Grade and Elevated	Truxtun	This alternative maintains optimal speed and is removed from the Flying-J refinery but displaces many residences in East Bakersfield, an EJ community. Carry forward pending discussions with Authority on community impacts.
2A	Traversing Refinery, Reduced Speed	Technical Team / Stakeholders	Full Alignment Alternative	Combination of At-Grade and Elevated	Truxtun	Reduced operating speed may be acceptable because of reduced impacts on land uses and communities. Carry forward pending discussion with the Authority on the Flying-J refinery risk, BNSF yard intrusion, and value of carrying forward alternatives that do not allow optimal speed.

**TABLE 5 – Merced to Bakersfield (Bakersfield Study)
Summary of Initial Screening**

Alternative	Alternative Description	Origin	Scope	Predominant Profile	Station Location	Conclusion
2C	Traversing Refinery, Optimal Speed	Technical Team / Stakeholders	Full Alignment Alternative	Combination of At-Grade and Elevated	Truxtun	Although operating throughout Bakersfield at optimal speed, this alternative directly impacts 2 schools, one park, and the BNSF yard. If the alignment can't be effectively redrawn, this alternative should be dropped from further consideration.

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Appendix A: INITIAL SCREENING ANALYSIS

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Appendix A: Draft Initial Screening Analysis (Bakersfield Study)

					Program EIR/EIS Preferred Alignment			Option 1A			Option 1D			Option 2A			Option 2C		
Objective	No.	Criteria	Metric	Scoring Guide	At-grade	Elevated	Program EIR/EIS Preferred Alignment Comments	All At-grade	Elevated	Option 1A Comments	All At-grade	Elevated	Option 1D Comments	All At-grade	Elevated	Option 2A Comments	All At-grade	Elevated	Option 2C Comments
Severe Constraints	1a	Engineering complexity	Number of miles of alignment elevated, at grade, and below grade	- High impact - Medium impact - Low impact	12.6 miles	6.9 miles	Substantial portion of at-grade alignment may reduce capital cost and limit visual impacts	13.6 miles	6.2 miles	Substantial portion of at-grade alignment may reduce capital cost and limit visual impacts	12 miles	7.6 miles	Substantial portion of at-grade alignment may reduce capital cost and limit visual impacts	12.1 miles	7.4 miles	Substantial portion of at-grade alignment may reduce capital cost and limit visual impacts	7.0 miles	12.6 miles	Most elevated track, higher capital cost
	1b		Number of major waterways (river and canals) crossed by the alignment	- High impact - Medium impact - Low impact	1 crossing	3 crossings	Fewer water crossings	5 crossings	3 crossings	Most water crossings, increase in capital cost	1 crossing	6 crossings	Medium number of water crossings	1 crossing	6 crossings	Medium number of water crossings	1 crossing	3 crossings	Fewer water crossings
	2	Limiting Speed	Lowest operating speed at any point on the alignment	< 219 mph 220 – 249 mph > 250 mph	190-220 mph	190-220 mph	Slowest alternative, does not meet optimum design speed	220-250 mph	190-220 mph	Does not meet optimum design speed in elevated sections	250 mph	250 mph	Meets optimal design speed throughout	220 mph	220 mph	Slightly less than optimal speed throughout	250 mph	250 mph	Meets optimal design speed throughout
	3	Railroad right-of-way access	Number of miles of alignment that require shared use of freight railroad rights-of-way	- High impact - Medium impact - Low impact	1.0 miles	0.5 miles	Minimal use of BNSF ROW. Alignment parallels freight rail ROW for several miles.	3.2 miles	0.8 miles	Use of BNSF ROW. Alignment could affect yard operations. Alignment also parallels freight rail ROW for several miles.	2.4 miles	1.9 miles	Most use of BNSF ROW. Alignment also parallels freight rail ROW for several miles.	3.3 miles	1.4 miles	Most use of BNSF ROW may produce greatest operational impacts on freight rail and yard operations. Alignment also parallels freight rail ROW for several miles.	2.0 miles	1.2 miles	Use of BNSF ROW. Alignment also parallels freight rail ROW for several miles.
	4	Public right-of-way access	Number of miles of alignment that require shared use of Caltrans rights-of-way	- High impact - Medium impact - Low impact	6.1 miles	1.0 miles	Greatest use of shared road ROW. Edison Highway ROW required.	0 miles	0.4 miles	Limited use of road ROW, but follows 14th Street at Bakersfield High, which could be a major issue for the high school.	1.4 miles	0 miles	Limited use of road ROW, but impedes on Edison Highway ROW	1.5 miles	1.2 miles	Impedes on Edison Highway ROW and follows 14th Street at Bakersfield High, which could be a major issue for the high school.	1.4 miles	0	Impedes on Edison Highway ROW.
	5	Railroad operations	Number of active railroad sidings that will be severed by the alignment	- High impact - Medium impact - Low impact	0 sidings	N/A	No impact on sidings	1 siding	N/A	Negligible impact on sidings	1 siding	N/A	Negligible impact on sidings	1 siding	N/A	Negligible impact on sidings	0	N/A	No impact on sidings
	6	Operational safety	Does the alternative traverse property or features that could endanger safe HST operation?	- Yes - Unable to determine - No	yes	yes	Traverses the middle of the Flying J refinery. If refinery continues operation, risk of gas release/explosion effect on HST operation may be unavoidable	yes	yes	Passes south of refinery. Risk of gas release/explosion more limited and can be mitigated.	yes	yes	Passes south of refinery. Risk of gas release/explosion more limited and can be mitigated.	yes	yes	Traverses the middle of the Flying J refinery. If refinery continues operation, risk of gas release/explosion effect on HST operation may be unavoidable	yes	yes	Traverses the middle of the Flying J refinery. If refinery continues operation, risk of gas release/explosion effect on HST operation may be unavoidable
Conflicts With Existing Conditions	7a	Land use impacts	Is the station located in the cities' designated central business district?	- Yes - Unable to determine - No	yes		Same for all alternatives	yes		Same for all alternatives	yes		Same for all alternatives	yes		Same for all alternatives	yes		Same for all alternatives
	7b		Number of miles of the alignment that traverse agricultural (includes all definition of agricultural land) land	- High impact - Medium impact - Low impact	4 miles		Slightly less than other alternatives	6 miles		Highest impact on agricultural lands	5 miles		Medium impact on agricultural land	5 miles		Medium impact on agricultural land	4 miles		
	8	Section 4(f) impacts	Number of 4(f) resources located within ¼ mile of the alignment: - Fresno & Bakersfield (urban) – 4(f) is (a) parks and recreation areas, (b) wildlife refuges, and (c) cultural resources, including historic sites. - Bakersfield-Fresno (rural) - 4(f) is (a) parks and recreation areas, (b) wildlife refuges, (c) cultural resources, including historic sites, and (d) wildlife management areas and wild and scenic rivers.	- High impact - Medium impact - Low impact	12 4(f) properties		Multiple Section 4(f) properties would be affected	9 Section 4(f) properties		Lowest number of Section 4(f) properties affected	12 Section 4(f) properties		Multiple number of Section 4(f) properties would be affected	10 Section 4(f) properties		Multiple number of Section 4(f) properties affected	10 Section 4(f) properties		Multiple number of Section 4(f) properties affected. Unlike other alternatives, directly affects one park and buildings at two schools
	9a	Community Impacts	Number of miles of alignment that traverse incorporated communities and census-designated places	- High impact - Medium impact - Low impact	7 miles		Not a discriminator	8 miles		Not a discriminator	8 miles		Not a discriminator	7 miles		Not a discriminator	7 miles		Not a discriminator
	9b		Number of census tracts with population at poverty status, 10% greater than countywide, within a quarter mile	- High impact - Medium impact - Low impact	8 census tracts		Although traverses the lowest number of tracts with poverty status, this alternative displaces multiple residential and industrial uses in environmental justice community of Edison	10 census tracts		Impact on low income communities	10 census tracts		Impact on low income communities, particularly East Bakersfield	10 census tracts		Impact on low income communities	10 census tracts		Impact on low income communities particularly East Bakersfield north of UPRR. Substantial number of environmental justice households displaced
	10a	Property impacts	Number of agricultural parcels traversed by the alignment	- High impact - Medium impact - Low impact	11 agricultural parcels		Low number of agricultural parcels affected	20 agricultural parcels		Highest number of agricultural parcels affected	15 agricultural parcels		Low number of agricultural parcels affected	14 agricultural parcels		Low number of agricultural parcels affected	13 agricultural parcels		Low number of agricultural parcels affected
	10b		Number of residential parcels traversed by the alignment?	- High impact - Medium impact - Low impact	131 residential parcels		A number of residential parcels affected	116 residential parcels		Lowest number of residential parcels affected	174 residential parcels		Large number of residential parcels affected, many in East Bakersfield	129 residential parcels		A number of residential parcels affected	210 residential parcels		Most residential parcels affected, including substantial number in East Bakersfield
	10c		Number of commercial parcels traversed by the alignment	- High impact - Medium impact - Low impact	51 commercial parcels		Major downtown commercial and civic buildings would be displaced, including Rascobank Convention Center and Area, and Main Library	60 commercial parcels		Highest number of commercial properties affected	58 commercial parcels		Large number of commercial properties affected	56 commercial parcels		Large number of commercial properties affected	39 commercial parcels		Fewest commercial properties affected
	10d		Number of industrial parcels traversed by the alignment	- High impact - Medium impact - Low impact	40 industrial parcels		Multiple packing/shipping facilities would be displaced in Edison, major loss of employment center for environmental justice community	58 industrial parcels		Large number of industrial parcels affected	62 industrial parcels		Highest number of industrial parcels affected	50 industrial parcels		Large number of industrial parcels affected	31 industrial parcels		Fewest industrial properties affected
	11	Connectivity	How well does the station site mesh with the existing road and traffic network?	- Poorly - Average - Well	Well		Good access from Truxtun Avenue	Well		Good access from Union and Q	Well		Good access from Union and Q	Well		Good access from Union and Q	Average		Good access from Union
	12		How well does the station site mesh with the existing transportation network?	- Poorly - Average - Well	Well		At Amtrak station intermodal facility	Well		At Amtrak station intermodal facility	Well		At Amtrak station intermodal facility	Well		At Amtrak station intermodal facility	Well		At Amtrak station intermodal facility
Approved Future Development in the Study Area	13a	Land use impacts	Number of parcels planned for development traversed by the alignment	- High impact - Medium impact - Low impact	2 development parcels		Few affected development parcels	1 development parcel		Few development parcels but possible regional shopping center affected	4 development parcels		Most development parcels affected, including possible regional shopping center	1 development parcel		Few development parcels affected	2 development parcels		Few development parcels affected
	13b		Number of parcels planned for development impacted by the station footprint	- High impact - Medium impact - Low impact	0 development parcels		Not a discriminator	0 development parcels		Not a discriminator	0 development parcels		Not a discriminator	0		Not a discriminator	0		Not a discriminator
	14	Public and political support	Is the alternative supported by regional/local plans and policies?	- Yes - Unable to determine - No	No		TAG voted unanimously to drop this alternative	Undetermined		Concern about affect on proposed development	Undetermined		Concern about affect on proposed development	Undetermined			Undetermined		

APPENDIX F

Impacts Common to All Alternatives

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APPENDIX F-1

Impacts Common to All Alternatives – Fresno Subsection

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Impacts Common to All Alternatives – Fresno Subsection

Impacts common to all alternatives, or common to a particular type of alternatives, such as elevated station alternatives (B1 through B6 and B13) or at-grade station alternatives (B7 through B12), are summarized below by evaluation category. Detailed AA evaluation results can be found in Chapter 4.0 of Volume I.

Alignment/Station Performance

Travel Time and Route Length – The length of the Fresno Subsection varies from 20 to 22.5 miles. Travel time through the Fresno Subsection ranges among the alternatives from 6 minutes, 8 seconds to 6 minutes, 24 seconds at the through-train operating speed of 220 mph.

Intermodal Connections – Intermodal connections for the HST occur at the Downtown Fresno station. The Fresno Area Express has indicated they will adjust their local and regional routes and their Downtown Circulator Service to provide connections with the HST station. Potential future bus rapid transit (BRT) or light rail transit (LRT) would connect to the HST station either directly or via shuttle service.

Capital Costs – For the elevated station alternatives (B1 through B6 and B13), the most significant costs would be those of the elevated structure and station, at a height of approximately 60 feet above ground level. For the at-grade station alternatives (B7 through B12), the principal cost elements would be the flyover of roadways or railroad facilities, such as the elevated structures over SR-99 or Calwa Yard, and the potential reconfiguration of existing highway overpasses, grade separations, and grade crossings.

Operating Costs – All of the alternatives appear to have similar operating costs.

Maintenance Costs – For all the alternatives (including the stations), elevated structures would impose a higher maintenance cost than would at-grade alignments. Alternatives to which access is limited by their adjacency to other uses would also have higher maintenance costs.

Land Use

Potential for Transit-Oriented Development – The Downtown Fresno redevelopment project area encompasses all potential stations. The Fresno Redevelopment Agency anticipates continued investment in revitalization of the area. Fresno's Downtown and Community Revitalization Department has initiated the Fulton Corridor Specific Plan and Downtown Neighborhoods Specific Plan, both aimed at maximizing development potential in their study areas, which include the potential HST stations. While Fresno's efforts would complement HST investment at all locations, the alternatives with a station on the eastern side of the UPRR, facing downtown, would have slightly greater potential for TOD based on their proximity to Fresno's developed core.

Consistency With Other Planning Efforts – Fresno's General Plan includes no policy direction that would favor one alignment over another, while it appears that all proposed stations would be consistent with the City of Fresno General Plan's policy objectives for Downtown Fresno.

Constructability

Constructability Within Existing Transportation Right-of-Way – Construction of the elevated structures over active roadways such as SR-99 and Golden State Boulevard would cause disruption to the road network and would require some roadway closures. At-grade station alternatives, particularly UPRR West

and Golden State Boulevard, would require reconfiguration and re-construction of the SR-180 and SR-41 UPRR right-of-way overcrossings.

Construction of a station next to the active UPRR line would be complicated for either the elevated alternatives (B1 through B6 and B13) or at-grade station alternatives (B7 through B12), due to clearance and access limitations in and around the UPRR right-of-way.

Access for Construction Within Existing Transportation Right-of-Way – The alternatives are generally accessible for construction from the local road network. The volume of construction traffic could adversely affect traffic operations in Downtown Fresno. Construction of elevated structures over active rail lines would be constrained by working restrictions near live tracks, access limitations, and temporary closure limitations.

Disruption to Existing Railroads (During Construction) – UPRR and possibly BNSF would need to be crossed with elevated structures that would require temporary closures of the BNSF and UPRR mainlines, and disruption to existing BNSF, UPRR, and Amtrak rail service. The UPRR alternative alignments would be immediately adjacent to the UPRR right-of-way, which could limit access for construction, or disrupt freight operations.

The elevated station alternatives (B1 through B6 and B13) would not sever connections with the SJVR, but could impact the railroad operations with temporary closures during construction. All of the at-grade station alternatives (B7 through B12) would sever existing connections with the SJVR, either to the west or east of the UPRR alignment through central Fresno.

Disruption to and Relocation of Utilities – The alternatives cross natural gas lines, electrical transmission lines, storm drains, water lines, sewer lines, and planned pipelines for the Fresno Metro Flood Control District. The majority of the utilities crossed by the elevated station alternatives (B1 through B6 and B13) in the downtown area and at the station are buried and are less likely to be affected by the limited area required by the pier locations than the at-grade station alternatives. All alternatives are likely to require some reconfiguration of overhead power transmission lines.

Community Impacts

Displacements – The Fresno Subsection alternative alignments and stations principally affect industrial and commercial parcels. The UPRR East alternatives, as well as Alternative B13, have varying degrees of effect on residential properties on the eastern side of Weber Street north of Olive Avenue.

Properties with Affected Access – Both the UPRR West and Golden State Boulevard alternatives would require a reconfiguration of Golden State Boulevard in the vicinity of Roeding Park, potentially affecting properties with access from Golden State Boulevard.

Local Traffic Effects Around Stations – The three potential stations are orthogonal to the same general area of the local street grid, and therefore do not substantially differ in terms of potential local traffic effects. The at-grade station alternatives would all sever existing grade crossings of the UPRR through downtown Fresno, or require their grade separation.

Local Traffic Effects at Grade Separations – The elevated alternatives (B1 through B6 and B13) would maintain the existing road network and at-grade crossings. The elevated alternatives would not prevent future grade separations over the UPRR being constructed outside the station footprint. The at-grade station alternatives (B7 through B12) would require the grade separation of some local streets. Generally, such grade separations would eliminate existing at-grade conflicts between the existing freight rail service and automobile traffic, thus improving local traffic conditions. In cases where the local roadway network would be interrupted by the grade separations, traffic congestion could worsen due to the funneling of traffic onto these routes, and the disruption of the street grid by the grade separations themselves.

Environmental Resources

Waterways and Wetlands and Nature Preserves or Biologically Sensitive Habitat Areas Affected – None of the alternatives affect waterway crossings, wetlands, or nature preserves. Because all alternatives would be in developed areas, no impacts to natural areas or biological habitats are expected. Although the alignments do not cross any designated critical habitat, occurrences of the California tiger salamander and the California jewel-flower, as well as an occurrence of the Fresno kangaroo rat, have been reported within the alternative corridors. Both the California jewel-flower and the Fresno kangaroo rat are federally and state listed as endangered; the California tiger salamander is federally listed as threatened.

Cultural Resources – No nationally or locally listed historic structures are within the alignments of the elevated alternatives (B1 through B6 and B13) or for the majority of the at-grade alternatives (B7 through B12). However, Alternatives B2, B5, B8, and B11 may require relocation of the former Southern Pacific Station (an NRHP-listed property) or its incorporation into the new HST station complex. The alternatives cross one site listed in the CHRIS database. Seven structures listed on the NRHP are located within the station footprints. Only approximately 10 miles of the alternatives have been surveyed, and there is a potential for more cultural resources to be identified during further investigation. This may include contributing elements to the historic nature of Fresno's Chinatown, west of the UPRR between Mariposa and Ventura streets. Additionally, alternatives may have indirect impacts (e.g., visual, noise) to cultural resources that are outside the alignments; the elevated station alternatives (B1 through B6) would be expected to have greater potential for visual and noise impacts.

Parklands – Between 9 and 14 parks are within 0.25 mile of the alternatives, two of which are located directly west of the station footprints. All of the UPRR West and Golden State Boulevard alternatives (B1, B3, B4, B6, B7, B9, B10, and B12) would require taking a strip of land from the eastern edge of Roeding Park, a Section 4(f) and Section 6(f) resource.

Agricultural Lands – The alternative alignments traverse 23 to 47 acres of important farmland designated by the State of California Department of Conservation; 21 to 38 of these acres are classified as prime farmland. The stations do not impact farmlands.

Natural Environment

Noise/Vibration Effects on Sensitive Receptors – Noise-sensitive receptors are located within 700 feet (urban area) of the alternatives and the number of nearby sensitive receptors ranges from 481 to 747. The sensitive receptors are predominantly residential parcels. Thirty-three noise-sensitive receptors are located in the vicinity of the stations, which are also predominantly residential parcels. From 65 to 240 sensitive vibration receptors are located within 275 feet of the alternatives; these are predominantly residential parcels. Nineteen sensitive receptors for vibration are located near the stations; all are residential parcels.

Change in Visual/Scenic Resources – The elevated alternatives (B1 through B6 and B13) could visually impact residential parcels (596 to 1,512) located along the alternative, including properties in Chinatown, and would impact the views from Roeding Park. The at-grade alternatives (B7 through B12) could impact residents living south of Downtown Fresno, where the alternatives need to cross over SR-99, Golden State Boulevard, and Jensen Avenue.

Maximize Avoidance of Areas with Geologic and Soils Constraints – No known seismic faults, highly erodible soils, or landslides are located with the alternative alignments or stations.

Maximize Avoidance of Areas with Potential Hazardous Materials – Potential hazardous materials sites are located within the alternative and stations. The alternatives cross between 6 and 16 reported sites, and 14 locations have been reported within the station footprints. These sites are a mix of commercial and industrial businesses such as auto body shops and gas stations. Hazardous materials are likely to be

located within existing rail rights-of-way, and could include spilled fuel, oils, and chemicals, creosote from treatment of railroad ties, etc.; however, neither the alternatives nor the stations appear to be located on Superfund sites or land fills.

APPENDIX F-2

Impacts Common to All Alternatives – Rural Subsection

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Impacts Common to All Alternatives – Rural Subsection

Alternatives, Stations, and Local Options

Impacts that are common to alignment alternatives, associated stations, and local options are summarized below by evaluation category. Detailed alternative analysis evaluation results for the alternatives (C1 through C6 and CPAA) as well as the local options (i.e., CTT1, CTT2, CBP, CVS) can be found in Chapter 4.0 of Volume I.

Alignment/Station Performance

Travel Time and Route Length – Travel time through the Rural Subsection ranges from 28 minutes, 41 seconds to 29 minutes, 16 seconds at a travel speed of 220 mph. The length of the Rural Subsection varies from 105.2 to 107.3 miles, depending on the alternative. The Visalia station alternatives are longer than the BNSF alternatives. The CPAA option would be 0.6 mile shorter, and consequently would have a journey time 9 seconds shorter than the comparative portion of Alternative C1.

Intermodal Connections – Intermodal opportunities exist with all of the potential stations with nearby bus routes that could be adjusted to serve the stations. Possible intermodal opportunities with the San Joaquin Valley railroad also exist for three of the stations (198 West, 198 East, and 99 North). The CPAA option does not provide a station and therefore would not provide intermodal connections.

The Hanford-Visalia Kings Area Rural Transit (KART) services passes by the site of the 198 West/East station (3 daily roundtrips; 7:00 AM – 6:00 PM) as does long-distance Orange Belt Stages and Greyhound. Additional future bus service to the site is anticipated.

Capital Costs – The capital costs when considered along the full length of the alignments will not vary significantly; however, alternatives through towns would be incrementally more expensive due to the need for extended viaducts or as a result of impacts to the existing road network and BNSF operations. All alternatives require a crossing of the San Joaquin Valley Railroad and numerous highway crossings. CPAA would include a viaduct through Laton and would require a large number of grade separations through Hanford, which would increase construction cost and difficulty; however, CPAA overall is anticipated to be less expensive than the comparative portion of Alternative C1.

Operating Costs – The operational cost would be similar for all options. Longer alignments will have slightly higher operational costs. CPAA would have a slight reduction in operating costs due to its shorter length.

Maintenance Costs – The maintenance cost would be similar for all options. Longer alignments and elevated structures will have higher maintenance costs. Costs for CPAA are anticipated to be lower than the comparative alignments due to the reduction in the number of viaducts and the lack of a station.

Land Use

Potential for Transit-Oriented Development – Alternatives C1 through C6 generally skirt major urban areas while accommodating potential stations located outside currently urbanized areas. No known TOD zones have been identified around the proposed stations; however, all alignments and associated stations could accommodate TOD. CPAA does not include a station; therefore, there is no potential for TOD associated with this option.

Consistency With Other Planning Efforts – Each alternative alignment traverses designated agricultural land, as well as other sensitive land uses (i.e., municipal buildings, parks, canals, schools, and residential areas). Sensitive land uses are concentrated through Corcoran (adjacent to the BNSF corridor), Wasco, and North Shafter. Alternatives C3 and C6, which are located slightly to the east of the other analyzed

alternative alignments, would affect fewer urban developments than Alternatives C1, C2, C4, and C5. Land uses near the 198 West station, associated with Alternatives C1 through C3, could be easily adapted to support a rail station. An existing wastewater treatment plant may conflict with the proposed location of the 99 Center station (associated with Alternatives C4 through C6), as well as local option CVSB.

Although all alignments primarily pass through agricultural land, some sensitive impacts would occur, especially in southern part of alignment (Wasco and North Shafter)

Of the local options near Corcoran, the bypass would avoid impacts to sensitive sites (CTT1C), while the through-town options would impact industrial uses and potentially the airport. The Wasco/Shafter local options located on the eastern side of BNSF south of Shafter (CTT2A–CTT2C, CTT2E, and CTT2F) would impact planned BNSF yard development. Those local options that that bypass the towns (CTT2C and CTT2D) would affect a planned industrial park in Wasco; however, elevated local options may result in fewer impacts to sensitive land use. Both Fowler/Selma/Kingsburg local options (CBPA and CBPB) would pass almost entirely through agricultural land. CPAA traverses primarily agricultural land; however, CPAA would affect moderately sensitive land uses near Armona.

Constructability

Constructability Within Existing Transportation Right-of-Way – Construction within the existing BNSF right-of-way would affect BNSF operations, and would require restrictions on work procedures. Elevated crossings of BNSF right-of-way would require coordination of pier locations and possible reconfiguration of BNSF trackwork. At-grade alternatives in or alongside the BNSF right-of-way are likely to require the severing of spurs and sidings, a major impact. CPAA would follow the BNSF through Laton, which would increase construction complexity.

Access for Construction Within Existing Transportation Right-of-Way – All alternatives are generally accessible from the local road network. Construction of elevated structures over active rail lines would be constrained by working restrictions near active tracks, access limitations, and temporary closure limitations.

Disruption to Existing Railroads (During Construction) – The alternatives would cross the BNSF with elevated structures; construction of such structures would require temporary closures of the BNSF mainlines and disruption to existing BNSF and Amtrak rail service. At-grade solutions through towns would sever BNSF spurs and sidings. Spurs serving a number of BNSF customers would be severed by at-grade alternatives on the same side of the BNSF tracks. All alternatives are elevated over the San Joaquin Valley railroad. Restrictions on service would be required during construction of the elevated guideway. CPAA would have a larger impact on BNSF than Alternative C1, particularly through Laton and on the approach to Corcoran, because of a longer distance of construction adjacent to the railroad, and the complexity of the structures required through Laton.

Disruption to and Relocation of Utilities – All the alternatives cross gas lines, electrical transmission lines, storm drains, water lines, sewer lines, and pipelines. However, disruption to and relocation of utilities is not considered a differentiator in the evaluation of alternatives. CPAA would cross fewer electrical transmission lines and natural gas lines than the comparable portion of Alternative C1.

Community Impacts

Displacements – The rural Subsection alternative alignments and associated stations principally affect agricultural parcels. Alternatives C1 through C6 would all affect some industrial parcels (27 to 46) and a small number of residential parcels (3 to 8). Alternatives C4 and C5 would not affect any commercial parcels; the other alternative alignments would only affect one (C1, C2, and C6) or two (C3) commercial parcels. Stations would also affect predominantly agricultural parcels, with the exception of 99 North—this station's preliminary footprint would impact a 656 of residential parcels. The other stations associated

with Alternatives C3 through C6 would affect only agricultural parcels. Station 198 West could affect up to 11 residential parcels. All of the local options would also primarily affect agricultural areas, of these options only CBPB would affect a notable number of residential parcels (27); all other local options affect 0 to 6 residential parcels. Additionally, as would be expected, local options that maintain the alignment at-grade and through towns would affect the greatest number of industrial parcels. CPAA would affect substantially more residential parcels (41) in Laton, Corcoran, and near Hanford than comparable Subsections of Alternatives C1 through C3.

Properties with Access Affected – Of the alignment alternatives, C1 and C2 – which pass through Shafter, Wasco, and Corcoran – would affect access to the most properties; C3 and C6 only pass through Shafter, and therefore have the least potential impact to property access. Of the local options, CTT1A would have a significant impact on access to properties on the western site of the rail corridor. The other local options may affect access to adjacent properties; however, bypass and elevated options would generally affect access to fewer properties than through-town or at-grade options. Any temporary property access impacts as a result of CPAA are anticipated to be restored; no permanent access impacts are expected.

Local Traffic Effects Around Stations – All of the proposed stations associated with Alternatives C1 through C6, with the exception of 99 Center, have convenient and direct access to major thoroughfares (e.g., SR-198, SR-99). In general, the local options would have little to no impact on proposed stations, or local traffic near stations. However, local option CTT1A would require the relocation of the existing Corcoran Amtrak station, and based on current patronage forecasts, local option CVSC may have a minor impact on traffic in Goshen. CPAA does not include a station; therefore, there are no effects to traffic around stations.

Local Traffic Effects at Grade Separations – Based on the preliminary screening and analysis, change in LOS in the rural Subsection is not anticipated to be a differentiator between Alternatives C1 through C6 and associated stations, as well as local options CBPA and CBPB and the Visalia Station alignments (CVSA–CVSC). However, for the local alignment options at Corcoran and Wasco/Shafter, the at-grade in-town options (CTT1A, CTT2A, and CTT2E) would result in significant impacts on local traffic movement. The CPAA alignment through Laton is elevated and therefore no grade separation will be required. In the Rural Section, grade separations are not expected to have a significant impact on the local traffic.

Environmental Resources

Waterways and Wetlands and Nature Preserves or Biologically Sensitive Habitat Areas Affected – Alternatives C1 through C6 would cross waterways between Laton and Wasco, including branches of the Kings and Tule rivers. Alternatives C4 through C6 would cross a few more waterways and require slightly wider crossings than Alternatives C1 through C4. Each of the alternatives crosses 50 or more acres of known wetland habitat, including land within or near the Allensworth Ecological Reserve. Alternatives C3 through C6 also cross wetland habitat within or near the Pixley National Wildlife Refuge.

Alternatives C1 and C2 do not contain designated critical habitat for Endangered Species Act (ESA)-listed species. However, Alternatives C3 through C6 cross such habitat; Alternative C3 would affect the least amount of designated critical habitat (28 acres for one species [vernal pool fairy shrimp]), while Alternative C6 would affect the most (46 acres for three species [vernal pool fairy shrimp, tadpole shrimp, and California tiger salamander]). Seven other special-status species have also been documented in the corridors of each alternative (i.e., C1 through C6). None of the stations cross waterways, critical habitat, or areas of documented special-status species occurrences, although wetland habitat was documented within all three stations associated with Alternatives C4 through C6.

Both Fowler/Selma/Kingsburg local options (CBPA and CBPB) cross at least one waterway, approximately 5 acres of wetlands, 10 acres of designated critical habitat (for three species), and a commensurate number of documented occurrences of special-status species. Similarly, each of the Visalia Station local options would require four water crossings and would affect 10 acres of wetlands and 25 acres of

designated critical habitat (for three species). None of the Corcoran or Wasco/Shafter local options would affect designated critical habitat. Of the Corcoran local options, substantially more special-status species occurrences have been documented in CTT1C.

CPAA would cross the same number of waterways as the comparable section of C1; however, it would affect fewer wetland areas than Alternative C1. CPAA does not cross any designated critical habitat, though occurrences of special-status species have been documented within the footprint.

Cultural Resources – No NRHP-listed properties are present in any of the alternatives, stations, or local options. However, each alternative (C1 through C6) as well as each of the Corcoran local options (CTT1A – CTT1C) and Wasco/Shafter local options (CTT2A – CTT2F) cross at least one, and up to four, properties reported in the CHRIS database. No CHRIS-listed properties were documented within any of the proposed stations, or within local options CBPA, CBPB, or CVSA – CVSC. It should be noted that none of the corridors/station footprints have been completely surveyed, and therefore additional cultural resources may be present in these areas. There are no NRHP or CHRIS-listed properties in CPAA.

Parklands¹ – Alternatives C1 and C2 would result in direct impacts to less than 10 acres of parkland in the Allensworth State Historic Park, as well as potential impacts to five other parks. In contrast, Alternatives C3 through C6 would result in direct impacts to greater amounts of parkland in both Allensworth State Historic Park and the Pixley National Wildlife Refuge—both of which are considered Section 4(f) properties. Alternatives C3 through C6 would also result in potential indirect impacts to two to five other parks. Alternatives C3 and C6 would directly affect the most parkland, 46 acres and 48 acres, respectively. No parks are located within, or within 0.25 mile of any of the stations. None of the local options would result in direct impacts to parkland, although local options CTT1B, CTT2A–CTT2F, and CBPB could result in indirect impacts to one to two local parks. It should be noted that some of the cultural resources identified in the alignment and local option corridors may also be considered Section 4(f) properties; this would be verified during further environmental analysis. CPAA would not result in direct impacts to parkland, but could result in indirect impacts to approximately 0.8 acre of parkland in Corcoran. This is commensurate with the impacts in Alternative C1.

Agricultural Lands – The alignment alternatives traverse 796 to 988 acres of important farmland designated by the State of California Department of Conservation; 441 to 683 of these acres are classified as prime. Alternatives C1 and C2 would affect the least amount of important farmland, while Alternatives C5 and C6 would affect the most. Of the proposed stations, 99 North would affect the least important farmland (178 acres, of which 89 acres are prime) and 198 East would impact the most (750 acres, of which 724 acres are prime). All of the local options also impact important farmland. Generally, those options that are located farther from towns would affect more total farmland than those that traverse through or near towns. The local options would affect commensurate amounts of farmland within each focus area. CPAA would affect slightly more farmland, including 53 more acres of prime farmland, than the comparable portion of Alternative C1.

Natural Environment

Noise/Vibration Effects on Sensitive Receptors – All of the alternatives (C1 through C6) are within proximity to noise-sensitive receptors, which are overwhelmingly residential parcels, but also include historic sites and other uses. Alternatives C6 and C3 are near the least number of sensitive receptors (251 and 277, respectively); Alternatives C1 and C2 are near the most (898 and 909, respectively). While all of the stations are also in proximity to noise sensitive receptors, 198 West is near the most (30), while the stations associated with Alternatives C4 through C6 (i.e., 99 North, 99 Center, and 198 East) are all near less than five known receptors. Approximately 15 to 45 sensitive vibration receptors are

¹The Allensworth Ecological Reserve may also be considered a Section 4(f) property; this would need to be confirmed during future environmental analysis. Refer to *Waterways and Wetlands and Nature Preserves or Biologically Sensitive Habitat Areas Affected* above, for a discussion of potential impacts to this property.

located in proximity to the alternatives (C1 through C6); these are overwhelmingly residential parcels. Sensitive vibration receptors near the stations range from none at 198 East to 11 near 198 West. The near-town local option for the Fowler/Selma/Kingsburg area (CBPB) is located near less-sensitive noise receptors, but more-sensitive vibration receptors, than local option CBPA. Sensitive noise and vibration receptors near the CVS local options are commensurate with CVSA–CVSC, potentially affecting 2 to 3 sensitive noise, and 0 to 1 sensitive vibration receptors. In the Corcoran area, the local option that would bypass town (CTT1) would not affect any sensitive noise or vibration receptors; in contrast, the in-town options would affect 239 to 262 noise and 13 to 18 vibration receptors—the majority of which are residential parcels. Similarly, in the Wasco/Shafter area, the local options through town would affect roughly twice as many noise and vibration receptors as those options that bypass the town. CPAA would be located near almost twice as many noise-sensitive receptors, and substantially more vibration receptors (112 versus 13) than the comparable section of Alternative C1.

Change in Visual/Scenic Resources – Alternatives C4 through C6 would be predominantly at-grade Greenfield alignments, and therefore would be expected to have fewer visual impacts than Alternatives C1 through C3. However, the impacts from Alternatives C1 and C2 are anticipated to be minimal. Alternatives C1 and C2 have the greatest number of residential parcels (719 and 762, respectively) near grade-separated structures; Alternative C6 has the least (6). The 198 West and 99 North stations would be elevated, and would be expected to result in greater visual impacts than at-grade stations 99 Center and 198 West. Additionally, the elevated stations are within 0.25 mile of 124 to 695 residential parcels. Of the local options for the Fowler/Selma/Kingsburg area, the near-town option (CBPB) would be expected to result in slightly more visual impacts than the Greenfield option—which is farther from town. Of the Visalia local options, CVSC would be expected to have the greatest visual impact because it is elevated. In general, elevated local options would have greater visual impact when compared to local options that are at-grade (e.g., CTT1A) or bypass towns (e.g., CTT2C). There are substantially fewer residential parcels near the elevated portions of the CPAA option than the comparable portion of C1; however, the CPAA alignment passes through Laton on viaduct, creating a significant visual impact when compared with Alternative C1.

Minimize Avoidance of Areas with Geologic and Soils Constraints – All of the alternatives (C1 through C6) as well as all of the Wasco/Shafter local options (CTT2A–CTT2F) and the West Bypass (CPAA) cross a concealed quaternary fault just west of McFarland. No faults cross the proposed stations, or any of the other local options. All of the alternatives and local options traverse areas of highly erodible soils. Of the alternatives, Alternatives C1 and C2 encompass the largest area of these soils (approximately 190 acres), while Alternative C6 encompasses the smallest (66 acres). The entire station footprint of 198 West consists of highly erodible soils; no other stations occur on such soils. The local options contain a comparatively similar amount of highly erodible soils, though CPAA crosses more than the comparable portion of Alternative C1. No areas of high landslide susceptibility have been documented in any of the alignments, stations, or local options.

Minimize Avoidance of Areas with Potential Hazardous Materials – Potential hazardous materials sites are located within the alternatives and some stations. Alternatives C1 through C6 cross 1 to 3 reported sites; these sites consist of industrial businesses and a transportation facility. Thirteen hazardous materials sites have been reported in the footprint of 99 North; one was reported in the footprint of both 198 West and in 99 Center; and no sites were reported within the footprint of station 198 East. Hazardous materials sites were reported in each of the following local options: CBP2 (a feed mill), CVS3 (an industrial business), CTT2A and CTT2F (an industrial business), CTT2B and CTT2E (an industrial businesses and a transportation facility), and CTT2C (an industrial business). Hazardous materials are likely to be located within existing rail rights-of-way, and could include spilled fuel, oils, and chemicals, creosote from treatment of railroad ties; neither the alternatives nor the stations appear to be located on a superfund site or a land fill. No hazardous materials sites have been reported within CPAA.

Additional Local Option

Impacts specific to the local alignment option CAAA (Allensworth Avoidance Alternative), as compared with Alternative C1 in the same area, are summarized below by evaluation category. Detailed alternative analysis evaluation results for CAAA can be found in Chapter 4.0 of Volume I.

Alignment/Station Performance

Travel Time and Route Length – The CAAA option would be essentially the same length, and therefore the same journey time, as the comparative portion of Alternative C1.

Intermodal Connections – The CAAA option does not include a station on the Subsection; therefore, intermodal connections would not be provided.

Capital Costs – The CAAA option is anticipated to be less expensive than the comparative portion of C1.

Operating Costs – CAAA is anticipated to require commensurate operating costs when compared to C1.

Maintenance Costs – Maintenance costs associated with CAAA are anticipated to be similar to the other options in this area.

Land Use

Potential for Transit-Oriented Development – The CAAA option does not include a station; therefore, there is no potential for TOD associated with this specific option.

Consistency With Other Planning Efforts – The CAAA option would avoid all sensitive land uses.

Constructability

Constructability Within Existing Transportation Right-of-Way – Construction within the existing BNSF right-of-way could impact BNSF operations and require restrictions on work procedures. CAAA would not be located within an existing railroad right-of-way.

Access for Construction Within Existing Transportation Right-of-Way – Construction of CAAA would be in an open field.

Disruption to Existing Railroads (During Construction) – Implementation of the CAAA option would sever a BNSF spur near Alpaugh, similar to Alternative C1.

Disruption to and Relocation of Utilities – Utility crossings for CAAA are not a differentiator between alignment options.

Community Impacts

Displacements – As with the alternatives discussed above, the CAAA local option would affect primarily agricultural parcels.

Properties with Access Affected – Any temporary impacts to property access as a result of option CAAA are anticipated to be re-created; no permanent access impacts would be expected.

Local Traffic Effects Around Stations – CAAA does not include a station; therefore, there would be no effects to traffic around stations.

Local Traffic Effects at Grade Separations – CAAA is not adjacent to SR-43, and therefore would have fewer grade-separation impacts than Alternatives C1, C2, C3, C4, C5, or C6; however it is not anticipated that grade separations in the rural areas will significantly affect local traffic flow.

Environmental Resources

Waterways and Wetlands and Nature Preserves or Biologically Sensitive Habitat Areas Affected – CAAA requires no waterway crossings, but does cross 23 acres of wetland habitat, which is less than the comparable section of Alternative C1. The CAAA option does not cross designated critical habitat, although occurrences of special-status species have been documented within the option footprint.

Cultural Resources – No NRHP or CHRIS-listed properties are in CAAA.

Parklands – The CAAA was specifically developed to provide an option that avoided all direct impacts to parkland—in contrast to Alternatives C1 through C6, which do directly affect the Allensworth State Historic Park, the Allensworth Ecological Reserve, and/or the Pixley National Wildlife Refuge. Although CAAA would result in no direct impacts to parkland, it could result in indirect impacts to both the state park and the refuge. Impacts to these surrounding Section 4(f) properties would be determined during subsequent environmental analysis. It should be noted that these options have not yet been surveyed for cultural resources; therefore, additional Section 4(f) properties may be within or adjacent to the option corridors.

Agricultural Lands – The CAAA alternative, which diverges into farmland to avoid impacts to parklands, would affect more farmland—including prime farmland—than the comparable alignment option (C1).

Natural Environment

Noise/Vibration Effects on Sensitive Receptors – Option CAAA would not be located in the vicinity of any noise or vibration sensitive receptors.

Change in Visual/Scenic Resources – CAAA is at-grade and would have a similar impact as Alternative C1. No elevated structures would be constructed under option CAAA, which would minimize visual impacts from this alternative.

Minimize Avoidance of Areas with Geologic and Soils Constraints – CAAA crosses a concealed quaternary fault just west of McFarland and does not cross areas of high landslide susceptibility. CAAA crosses less highly erodible soils than the comparable length of Alternative C1.

Minimize Avoidance of Areas with Potential Hazardous Materials – No hazardous materials sites have been reported within CAAA.

APPENDIX F-3

Impacts Common to All Alternatives – Bakersfield Subsection

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Impacts Common to All Alternatives – Bakersfield Subsection

Impacts that are common to all alternatives or options are summarized below by evaluation category. Detailed alternative analysis evaluation results can be found in Chapter 4.0 of Volume I.

Alignment/Station Performance

Travel Time and Route Length – Travel time through the Bakersfield Subsection ranges from 4 minutes, 48 seconds to 4 minutes, 56 seconds, at a travel speed of 220 mph throughout the Subsection. The length of the Bakersfield Subsection varies from 17.6 to 18.0 miles depending on the alternative.

Intermodal Connections – Intermodal connections for all HST alternatives would occur at or near the Downtown Amtrak station. HST station design would facilitate intermodal transfers by connecting bus and train boarding areas with HST station platforms via pedestrian walkways. Local transit serving the portion of downtown near the Amtrak station would be rerouted to provide direct intermodal connections. The D1 alternatives are more proximate to the Amtrak station and would require less extensive walkways to connect with Amtrak and local bus services.

The station platform for Alternative D-2N is south of the BNSF alignment, more than one block from the Amtrak station, which contains intercity and local bus bays adjacent to the station and is served by bus routes within a quarter-mile along nearby streets. Pedestrian links between the HST platforms and the Amtrak station as well as nearby bus routes could be readily designed.

Capital Costs – For all alternatives, the major costs would involve construction of elevated guideways in confined areas and property acquisition. Although the linear footage of elevated structures and number of parcels to be acquired may not be substantially different among alternatives, the complexity of construction and types of properties to be acquired would vary by alternative. For example, Alternative D1-N requires a massive elevated structure constructed on a skewed angle to cross the UPRR right-of-way at two locations. The placement of piers would likely fall inside the UPRR right-of-way, which UPRR may not allow, or may negotiate demanding terms. The D1 alternatives would require negotiation with BNSF to arrange relocation of track in the BNSF yard, and to replace the Industrial Arts Building at Bakersfield High School. Alternative D2-S would be elevated over the BNSF for 2.7 miles through central Bakersfield. The straddle bents to support a four-track elevated structure would stretch beyond the BNSF right-of-way, requiring property, including the Industrial Arts Building, from BNSF, the school district, and commercial properties that border the BNSF mainline on the north and south. Alternative D2-N would have two flyovers of the BNSF mainline in central Bakersfield.

Operating Costs – For all alternatives, the alignments transition from at-grade to elevated, and remains elevated for most of the length through Bakersfield. As a result, operating costs and power costs for all alternatives would be similar.

Maintenance Costs – The linear feet of elevated structures would be similar for all alternatives, and would therefore generate comparable maintenance costs.

Land Use

Development Potential for Transit-Oriented Development – The Metropolitan Bakersfield High Speed Rail Terminal Impact Analysis (Kern Council of Governments, July 2003), identified the Amtrak station as the preferred site for an HST station. Alternatives D1 and D2 include stations at the preferred site. To the south of the Amtrak station, the Bakersfield Redevelopment Agency has allotted a 200-foot setback within the Mill Creek Redevelopment Area to provide land for station area development and integration with redevelopment projects. Although the western portion of the redevelopment area contains

residential projects that have already been permitted, the remainder of the area has potential for TOD directly connected to the HST station at either location. The Alternative D2 station platform would extend beyond the 200-foot setback into this area, so the opportunity for development may be fostered or hindered depending on the City's redevelopment plans. Alternative D1, which is adjacent to the Amtrak station, would not interfere in redevelopment projects, but has constructability issues over the BNSF mainline that might make integration with development to the south difficult.

Consistency With Other Planning Efforts – The Metropolitan Bakersfield General Plan Update (April 2009) and regional transportation planning documents (Regional Transportation Plan, Kern COG, 2007) have policies to support the implementation of high-speed rail through Bakersfield with a station located at the Amtrak station. As indicated in the above discussion, Alternatives D1 and D2 would have station platforms in this area, although Alternative D2 would intrude into the Mill Creek Redevelopment Area and may conflict with redevelopment plans. Bakersfield Commons, a planned mixed-use development in West Bakersfield, would be traversed by all alternatives and may change the land use and transportation network being proposed in that project's EIR. An easement to allow HST construction and operation through the property would need to be incorporated into the project's entitlements.

In July 2003, The City, County, and Kern Council of Governments adopted the Terminal Impact Analysis report that identifies the Amtrak station as the preferred location for a HST station. All alternatives support this recommendation and in general conform to the proposed concept plan for the site.

All of the alternatives would intrude on the proposed Bakersfield Commons development.

Constructability

Constructability Within Existing Transportation Right-of-Way – Construction of the elevated structures over active roadways such as Rosedale Highway, SR-99, and Westside Parkway (currently under construction) would cause moderate disruption to the road network and would require some temporary roadway closures. Piers would be needed in the median of East California Avenue for the D2 alternatives, and East Truxtun Avenue for the D1 alternatives. Construction of the piers would be constrained by the proximity of active traffic and access restrictions. If required to accommodate roadway traffic, elevated trackway could be fabricated off site and lifted into place during temporary road closures. In addition, Alternatives D1-S and D2 paralleling the UPRR at-grade along Edison Highway would require a realignment of Edison Highway to maintain access for bordering uses.

Constructability of a HST station over the BNSF mainline would be complex and would involve BNSF and Amtrak track relocation for the D1 alternatives. Similar construction complexity would be encountered over the BNSF yard and BNSF mainline in central Bakersfield for Alternatives D1 and D2-S. Elongated and skewed elevated structures would flyover the UPRR yard at Kern Junction and near Morning Road for Alternative D1-N, requiring pier placement within the UPRR right-of-way. Shorter flyovers of BNSF would occur for Alternative D2-N west of SR-99 and west of the Convention Center. Construction within or over the freight railroads would produce temporary impacts on railroad operation.

Access for Construction Within Existing Transportation Right-of-Way – The alternatives are generally accessible from the local road network. Construction activities could have an adverse effect on traffic congestion, particularly in central and east Bakersfield. Construction of elevated structures over active rail lines would be constrained by working restrictions near live tracks, access limitations, and temporary closure limitations. Construction activities could be restricted by clearance and access limitations in the UPRR right-of-way and by negotiations with BNSF.

Disruption to Existing Railroads (During Construction) – UPRR and BNSF would be crossed with elevated structures; construction of such structures would require temporary closures of the BNSF and UPRR mainlines and disruption to existing BNSF, UPRR, and Amtrak rail service. The elevated alternatives would not sever connections to the SJVR at Kern Junction. However, the at-grade alignment for

Alternatives D1-S and D2 along Edison Highway could affect railroad operations along a spur line from the UPRR east of Fairfax Road.

Disruption to and Relocation of Utilities – The alternatives cross natural gas lines, electrical transmission lines, storm drains, water lines, sewer lines, and pipelines. Because the alternatives are primarily elevated throughout Bakersfield, overhead transmission lines would be affected, and need to be raised. Utilities that would conflict with pier placement, such as a substation north of the UPRR east of Fairfax Road for Alternative D1-N, may require relocation. Utilities paralleling Edison Highway may also have to be relocated for Alternative D1-S and D2.

Community Impacts

Displacements – All alternatives would displace 70 to 80 residences in the Rosedale area between Hageman Road and Calloway Drive, and traverse the southern third of the proposed mixed-use Bakersfield Commons development. The initial screening examined other alignments to the east and west of the BNSF right-of-way through the Rosedale area, and determined that, using Authority design and operating criteria, additional homes, parks, commercial properties, and schools would be displaced by alternative alignments. In central Bakersfield, small businesses, a portion of the City corporate yard, and storage facilities on the northern side of the BNSF mainline would be displaced by Alternative D2-N. Similarly, the Alternative D1 alignments would displace commercial uses on the southern side of the BNSF mainline, as well as the Industrial Arts Building on the Bakersfield High School campus. Because of the expanse of the 4-track elevated structure over the BNSF mainline for Alternative D2-S, this alternative would displace uses, including the Industrial Arts Building, on both sides of the BNSF right-of-way. Additional displacements of residences and commercial/industrial enterprises would occur in East Bakersfield for Alternative D1-N and D1-S, respectively. The D2 alternatives would displace fewer residential and commercial/industrial uses than the D1 alternatives.

Properties with Access Affected – Alternatives D1-S and D2 would require a realignment of Edison Highway, potentially affecting properties with access to Edison Highway.

Local Traffic Effects Around Stations – The two potential stations rely on the same local street grid and thus are not substantially different from one another in terms of potential local traffic effects. An expanded street grid in the Mill Creek Redevelopment Area would facilitate access to the HST stations from the south. Access to the HST station area would be at grade and may require new circulation patterns off the existing street grid to access the station. Existing Level of Service data indicates that the streets surrounding the HST station area for all alternatives are currently operating adequately (Levels of Service A-C) and may not be substantially affected by changed access patterns at the HST station.

Local Traffic Effects at Grade Separations – The elevated alignments would not create long-term traffic impacts and congestion. In cases where the local roadway network would be interrupted by construction of grade separations, traffic congestion could temporarily worsen due to the funneling of traffic onto these routes.

The at-grade guideway would affect minor roadways in all of the alternatives (though the number of roadways varies by alternative; see text). For each of these roadways, a decision would be necessary to determine whether the road would be closed or grade separated.

In addition, new grade separations would need to be constructed and existing grade separations and interchanges would need to be adjusted to account for the high speed rail alignments/profiles. This would cause Level of Service impacts during construction. The number of affected intersections is shown in the text.

Roadways surrounding the station area are operating at acceptable levels. The station is elevated in all alternatives and would not impede or interfere with traffic circulation or substantially deteriorate Level of Service at nearby intersections.

Environmental Resources

Waterways and Wetlands and Nature Preserves or Biologically Sensitive Habitat Areas Affected – All alternatives cross the Kern River at a similar location just west of Truxtun Avenue. The Kern River is approximately 350 feet wide at the location of the D1 alignment crossing, and 200 feet wide for the D2 crossings. Pier placement for the elevated crossings would be located to avoid the riverbed and recreational trails that have been established along the Kern River. Exclusive of the Kern River, the

alternative alignments traverse developed areas and therefore do not cross any designated critical habitat. No impacts to natural areas/biological habitats would be expected.

The alignment does not cross any designated critical habitat, but does cross occurrences of the California jewel-flower, San Joaquin Kit Fox and the San Joaquin woolly threads north of town from Allen Rd south to Fruitvale Avenue, as well as an occurrence of the Bakersfield cactus south of town around Edison Road. The Bakersfield cactus and the California jewel-flower are both state and federally listed as endangered. The San Joaquin Kit Fox is federally listed as endangered and state listed as threatened. The San Joaquin woolly threads is federally listed as endangered.

Threatened and endangered habitat impact totals 39 species located within 4 acres.

Cultural Resources – No nationally or locally listed historic structures would be directly or indirectly affected by the alternatives. Investigation of historic properties and archaeological resources potentially eligible for the NRHP would be conducted as part of the environmental impact analysis.

Parklands – Parklands within a quarter-mile of the alternatives would not be directly affected by construction or operation of high-speed rail. Pier placement for the elevated structure crossing the Kern River would have to be designed to avoid recreational trails established along the river bank.

Agricultural Lands – All alternatives would traverse 18 acres of prime farmland. The stations would not impact farmlands.

Natural Environment

Noise/Vibration Effects on Sensitive Receivers – Noise-sensitive receptors, which those are located within 700 feet (urban area) of the alternatives, number over 3,200 properties for all alternatives, including over 3,000 residential parcels, 2 libraries (south of Truxtun Avenue between A Street and Chester Avenue), several churches, 1 hospital and several schools (two schools for the D2 alternatives to six for Alternative D1-N) many institutional and residential uses. Vibration-sensitive receptors, located within 275 feet of an alignment, number from 371 (Alternative D2-N) and 539 (Alternative D1-N). All alternatives may impact residential neighborhoods in Rosedale and East Bakersfield.

Change in Visual/Scenic Resources – The elevated alternatives could visually impact residential parcels located within a quarter-mile of the alternatives. In this regard, all alternatives would produce visual change to residential neighborhoods in Rosedale and East Bakersfield.

Kern River Parkway is a scenic resource for all alternatives. The Kern River Plan Element identifies policies to maintain and enhance the Kern River as a unique and valuable resource, including maintaining scenic views of the river. The HST alternatives bridge the river just south of the planned crossing of the Westside Parkway and, in conformance with the Plan Element, would avoid placing piers in the Kern River Parkway that could obstruct views for Parkway trail and recreational users.

Minimize Avoidance of Areas with Geologic and Soils Constraints – No known seismic faults, highly erodible soils, or landslide locations are within the alternative alignments or stations.

Minimize Avoidance of Areas with Potential Hazardous Materials – Potential hazardous materials sites are located near the alternative alignments. The alternatives cross or are close to 3 to 9 recorded sites, primarily associated with industrial facilities such as the Flying J Refinery. Hazardous materials are likely to be located within existing rail corridors, especially rail yards, and could include chemical spills, creosote treatment of railroad ties, etc.; however, the alternatives are not located on a Superfund site or a Landfill.

All alignments would pass close to the Flying J Refinery and pass over or through the BNSF Yard. The refinery and yard may harbor toxic materials that could be encountered during construction.

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